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THE Quincy Mining Company shows a dividend of 20 per cent for the past year on a capital of $1,000,000, and total dividends paid of $3,990,000, or nearly four times its capital.

IT is with sincere regret we have to announce the death of Dr. HARRISON WRIGHT, of Wilkes-Barre, Pa. Dr. WRIGHT was an accomplished chemist and geologist, and a gentleman whose noble personal character endeared him to all who knew him. Through Dr. WRIGHT'S untiring industry and wide and discriminating knowledge, the collections of the Wyoming Historical and Geological Society have become known as among the most interesting and valuable in this country, and a warm interest in that useful society was enlisted by his contagious enthusiasm for historical and scientific pursuits.

THE inauguration of the Washington Monument has called out a good deal of oratory, from the oration of Mr. WINTHROP to the sermons of innumerable clergymen delivered on the anniversary of his birthday. It is not surprising that nearly every body declares that the obelisk is like WASHINGTON, or WASHINGTON is like the obelisk. That was the only new thing that remained to be said about him. The most interesting speech of the occasion, to our mind, was that of Colonel CASEY, the engineer in charge, who described the manner in which the foundations of the monument had been widened and deepened, when it was half done, so as to render them capable of bearing the superstructure. This was a very creditable piece of engineering. We beg leave, however, to suggest for future orators the thought that in this particular WASHINGTON was not like the obelisk. His character and fame need no new foundations. And in view of the solidity of both, it may be worthy of note that he began life as an engineer—which is a good foundation, even for a statesman and soldier. *

THE Copper Queen mine, of Arizona, has been sold, conditionally, to an English company, the "Copper Queen United, Limited," having a capital stock of £350,000. The purchase price is £350,000, £100,000 in cash, and £250,000 in full-paid stock. The vendor guarantees that the company shall pay dividends at the rate of 20 per cent per annum for five years, and he deposits £50,000 in cash and copper, and £50,000 in stock as guarantee.

The prospectus says that the property has already paid in dividends $1,600,000, of which $1,450,000 was paid by the present company, $225,000 of it in 1884. The production is said to have been $1,043,073 in 1884. The London *Mining World* says that "the voluminous reports" have been "made by some of the leading experts of the day." Unfortunately, the extracts quoted are not such as to justify this broad claim. Thus:

"Mr. A. M. Womble speaks of the mines as having no parallel in the history of copper mining in the United States. He adds that 'there is in sight and ready for stoping sufficient ore to last for years, and by an increase of machinery the output will be greatly increased over even its present large production of 400 tons per month.' The report by Mr. Gillespie Stewart, M.E., states: 'My examination fully corroborates the splendid record of this mine from its commencement. The 400-feet level is well opened, developing an enormous body of ore of very high grade, exceeding in quality and quantity any thing yet developed; the extent would be hard to determine, as the headings are all in ore. A safe estimate can be made by taking the size of the vein at the lowest depth, and continuing it down 2000 feet would give 1,428,000 tons as the future production of the mine. . . . . I will, however, discount my estimate 50 per cent, and leave, say, 700,000 tons, would give over twenty-three years' steady work and a profit of $10,000,000, although the lower level shows the highest grade ore in the mines. . . . . This is based on the present production of the mine and on the low price of copper.' There are numerous other reports, as, for example, that of the late manager of the Great Sierra Consolidated Silver Mining Company of California, who, substantiating the statement as to the past payment of profits, adds, 'I have no hesitation in saying that Copper Queen will pay very high dividends for years to come.' Besides the increase in quantity, it has been proved by reports received since the prospectus was sent to press, that at one of the levels, 100 feet below the lowest level mentioned in the prospectus, a body of ore of immense richness has been cut, which fully confirms the statements that, as depth is attained, the ore would be found to improve in quality."

None of the gentlemen named is known to fame, and we need scarcely state that any such wild and loose statements as the above would tend to discredit a property in the eyes of any one familiar with mining. The Copper Queen is a good property, but investors should bear in mind that at the present price of copper any expectation that 50 per cent, or even 20 per cent, of the output will be net profit, is doomed to disappointment. It may also be of interest to the proposing purchasers to inquire whether a great part of last year's production of ore did not come from property not belonging to the Copper Queen Company, and whether the rich find referred to in the last paragraph above may not also belong to some one else. The columns of the ENGINEERING AND MINING JOURNAL some time ago referred to this alleged trespass, and we believe no settlement for the same has yet been made.

When we have seen the full reports of the experts, we may refer again to this subject. In the mean time, we commend to the readers of inflated prospectuses a calm perusal of the copper statistics and the copper markets, as reported in these pages during the past few months.

THE COPPER OUTLOOK.

WE publish in another column valuable statistics of copper, compiled by Mr. A. HARNICKELL, and a very carefully made estimate of copper consumption in Europe, made by Mr. S. RAUNHEIM. Though this estimate is not so agreeable to us as some more cheerful views that have recently been published, yet Mr. RAUNHEIM has unusual facilities for arriving at correct results, and is a most careful and reliable statistician. The announcement that we made last week of a large shipment of copper from an unexpected source, which had affected the price of Chili Bars, Mr. RAUNHEIM puts in the definite shape of 4000 tons of ingots from Japan. If this lot pushed Chili Bars to £47, what will be the effect of the further well-authenticated statement that the German Mansfeld Company holds 33,000,000 pounds, which, the company despairing of higher prices, will probably be marketed this year?

Should the English buy the Copper Queen, their avowed policy is to greatly increase the output of that concern. In view of such probabilities and figures as Mr. RAUNHEIM gives, it is difficult to preserve a very hopeful view of the immediate future of the copper market.

THE INSTITUTE MEETING.

The extraordinary vitality and activity of the American Institute of Mining Engineers received fresh illustration in the New York meeting, last week, the forty-first in the history of the Institute, and one of the largest in the whole list. The number of members actually registering was about 140; but this does not include many New York members who attended sessions without registering. The crowded sessions and the interest in the papers and discussions evinced by the audience gave conclusive proof that social distractions did not overbalance the solid professional and scientific motives which inspired so large an attendance. Among the papers presented were many of interest, novelty, and importance. Chief among these must probably be placed the description, in the papers of Messrs. WITHEROW and HUNT, of the stationary converter of CLAPP and GRIFFITHS, and its wonderful results, which, if substantiated by further practice, bid fair to inaugurate a new era for the manufacturers of pig-iron. Next to this, perhaps the new water-gas incandescent light of Mr. FAHNEHJELM attracted most attention as an invention opening an unexpected competition with both carbureted gas and electricity as sources of light. Scarcely less important was the demonstration in Professor BLAKE'S paper, but still more fully and conclusively in the description given by Mr. RIOTTE, and the complete series of specimens shown by him, that a productive source of tin has been practically tested in the Black Hills of Dakota. Mr. FULTON'S paper on fire-damp in the Johnstown mines furnished an original suggestion, most plausibly supported, as to the origin of this gas in that locality; and the papers of Messrs. WITHERBEE and TAYLOR gave striking instances of heroic treatment of blast-furnaces, which would have struck dumb with horror the iron-masters of an elder day. Another novelty was the new ore-sampler of Mr. BRUNTON; still another, the regenerative hot-blast oven proposed by Mr. LONG; and another still, the plan of Mr. LAUREAU for eliminating from the Bessemer converting-house the nuisance known as the casting-pit. We might go farther with this enumeration; but enough has been said to show that this meeting was prolific in new and suggestive matter.

In the way of excursions and entertainments, one might almost protest that there was too much. Such lavish hospitality might tend, perhaps, to discourage the residents of other cities. It would be a great pity if a meeting of the Institute should come to be looked upon as was, in former times, the visit of a king, as a great honor, involving well-nigh the ruin of the recipient. This need not, however, be the case. Such cities as Denver, Pittsburg, Cincinnati, Philadelphia, Chicago, Boston, or New York, containing, as they do, large numbers of resident members, and many industries directly connected with the Institute, may with propriety and with comparative ease offer an abundance and variety of entertainment which need not at all constitute a precedent to govern other cases. It must be remembered always that the best part of the enjoyment of these meetings lies, after all, in the reunion of friends and colleagues; and this can be secured without any elaborate preparations and entertainments.

At the same time, we see no reason for declining the attentions which have been so bountifully poured upon the Institute through its long series of meetings. That they are delightful in themselves, no one can deny. The hospitality of President and Mrs. MORTON, in Hoboken; of the Lackawanna Coal and Iron Company, at the Tilly Foster mine; and of Hon. and Mrs. EDWARD COOPER at their residence in this city certainly added to the meeting a halo of brilliancy; and the various excursions to Flood Rock, the Dixon Works, and numerous other places of professional interest undoubtedly enhanced the general interest of the meeting.

We hear little, of late years, from the wise heads which used to shake, and the wise tongues which used to wag, over the presence of the ladies and the growth of the social element in the meetings of the Institute. The conclusive answer to all the fears of technical decadence is furnished by the *Transactions*, never more valuable, and the membership, never more numerous, than to-day. When those who can not attend the meetings find the *Transactions* so diminished in value that membership is no longer desirable, it will be indeed time to take alarm. For the present, however, there is only one alarming feature in the case: the success of each meeting is so great as to inspire a fear lest this high standard can not be maintained. But we are getting used to that anxiety, and bear it more lightly than we once did.

The subscription-dinner of Thursday night was notable for its large proportion of ladies—some 70 out of a total of 175. It was nearly wrecked by unforeseen delay in seating the company—due directly and indirectly to the one mistake of the Local Committee, the arrangements of which were otherwise admirable. This mistake, which we note in no spirit of criticism, but as a wholesome warning to future committees, was the appointment of the dinner at the close of a day devoted to a general railroad excursion. The excursionists returned an hour and a half behind time, and the dinner began late. But, worst of all, every body was tired; and there was an atmosphere of fatigue about the otherwise brilliant and excellently planned and served entertainment. We have heard complaints that some of the speeches were long. This is true; but people measure time in such cases by their sensations, not by the clock; and we fancy that the longest speech of the occasion would not have seemed too long to a fresh and eager audience, such as usually attends the Institute banquets.

The choice of the Park Avenue Hotel as head-quarters proved to be a very happy one. It is roomy, quiet, comfortable, and conveniently located, and not the least pleasure of the meeting was the social intercourse of the numerous members who made it their home. *

CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes. We do not hold ourselves responsible for the opinions of our correspondents.]

Coal-Dust in Colliery Explosions.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the continuation of his article entitled "Notes on Coal-Dust in Colliery Explosions," contained in your number of January 24th last, Mr. E. S. Hutchinson has fallen into an error in stating that I am manager of Dinas and Adare collieries in South Wales. Before the occurrence of the explosion at Dinas Colliery, and for a time afterward, I knew that mine as one of the Government Inspectors. After I resigned my official position and became a consulting mining engineer, one of the appointments I obtained was that of consulting engineer to the proprietor of Dinas Colliery. In the capacity of Government Inspector, first, and in that of consulting engineer, secondly, I had the exceptional opportunities to examine the phenomena due to that explosion to which Mr. Hutchinson refers. Yours faithfully, W. GALLOWAY.

CARDIFF, Jan. 9, 1885.

Aneroid Barometers and Leveling Instruments.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: On the 10th of November, I commenced a geological and topographical survey of a large area of mountain land in this section of Tennessee. I have used during that time an aneroid barometer to ascertain elevations of cliffs, mountains, and coal seams. Lately, the company decided to have some lines of levels run, and, as a matter of scientific interest, I give you some results of the comparisons. We used as a base the piazza of a hotel near mile-post 48 on the Knoxville & Ohio Railroad, being by the datum of that road, 1517 feet above sea-level. Two coal seams, respectively 3 and 5 feet thick, show in the side of the mountain, only 20 feet apart, being called the Twin coals, from their proximity. My barometer had shown the top one to be 610 feet above the hotel named. The level proved it to be 613 feet. I had determined the top of a cliff from tip of the mountain to be 1150 above said hotel. The level proved it to be 1149. I could add many others. In a shorter distance, I was not so accurate; a coal nearer the house showing by level to be 29 feet above, while I had determined it to be about 50. Another, just above, I had determined to be 480, and the level proved it to be 450. As every mining engineer or geologist who has been out this winter can attest, the weather has been so changeable, especially in the South, that accurate determinations with an aneroid have been difficult to obtain.

My survey here has been the most elaborate ever given to any part of the Tennessee coal-field, and I am preparing accurate maps and sections.

Respectfully, HENRY E. COLTON.

BUCKEYE, CAMPBELL CO., TENN., Feb. 17.

The High Percentage Obtained by the Oxford Gold Mining Company.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In reply to a short editorial in your issue of February 21st, in which you expressed surprise at the high percentage of gold saved by amalgamation at the Oxford mine, in Nova Scotia, we desire to make a few remarks.

Our Dr. Herbert G. Torrey, while on a professional visit to other gold mines some fifty miles east of the above mine, was invited by Mr. De Camp to visit the Oxford property in the spring of 1882. During the course of his visit, a sample of several hundred pounds of ore was taken from a well-defined vein, not over 20 feet from the surface, and sent to New York, where, by amalgamation, we obtained $40 per ton.

We are glad to see by the paper of Willard I. de Pierce, of New York, read at the February Meeting of the Institute of Mining Engineers, that our results, on a small scale, have been so well sustained in the large way. This paper states that nearly 5000 tons have averaged about $23 per ton.

The ore, as we observed it in this mine and at various properties at Tangier and at Mount Uniacke, was mostly pure white quartz, surrounded more or less by slate and inclosed in well-defined walls, in most cases from three to six feet apart.

In our experience, most of the gold in Nova Scotia is in nuggets or crystals in the quartz, and more or less runs into the slate.

We are not surprised that, with careful work at the stamps, from 94 to 98 per cent of the gold in the ore is obtained.

Allowances for the stealing spoken of in your JOURNAL may effect a reduction of this percentage; but the stockholders surely will not grumble that the manager of the Oxford property has not been forced to take this into account in making his report to the company.

It must be remembered that, in ore not averaging over $20 per ton, nuggets are often found weighing from one quarter to one half an ounce, which must remain in the battery; and it will be safe to say that in many cases from 50 to 80 per cent never leaves the mortars.

Although we are not generally sanguine regarding mining property, and have seldom been able to satisfy either promoters or investors, we are none the less pleased to hear favorable news from Nova Scotia. In

fact, we have long felt that the gold-fields of Nova Scotia would yet return a handsome interest on investments judiciously expended in small enterprises of not over $100,000 or $200,000 capital. Yours, etc.,

U. S. ASSAY-OFFICE, NEW YORK CITY, Feb. 25. TORREY & EATON.

The Condition of the Copper Market.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The present anomalous condition of the copper market is due to mismanagement on the part of the largest copper producers in this country, and extends itself also to the European markets.

The ambition of these large producers to press smaller concerns to the wall, and to control the American consumption, could not more thoroughly be defeated than by the unbusiness-like manner in which their sales were made abroad.

The difference between Best Selected in England and Chili Bars was formerly £7. The Anaconda Company sold on basis of Best Selected in England, and the result was a decline of the difference between Best Selected and Chili of £3. The price of Best Selected is only £4 above Chili Bars. The Lake companies sold here and in Europe on the basis of Chili Bar price, thus making us here and abroad depend on the manipulations of jobbers in the English market. Our friends in England were shrewd enough to take in the situation, and handled the quotations of Chili Bars without mercy. While the copper thus sold returned hardly from 10½ to 10⅝ cents, the Quincy Company, having quit the pool, received returns for its copper equal to 12 cents.

On the open market, Hecla can be sold easily at 11⅝ cents; other brands of Lake at 11½ cents; even Montana and Arizona copper brands command higher prices, from 10¾ to 11 cents. The following statement (No. I.) shows the American production for the last three years (a slight modification of those very valuable statements published by Mr. Kirchhoff and Mr. Harnickell), and also my estimate of production for 1885, an increase of 66 per cent within four years, against no increase in consumption during the same period:

I. PRODUCTION OF THE UNITED STATES.

YEAR.	Michigan.	Montana.	Arizona.	Colorado.	Miscellaneous.	Imported Pyrites.	Total.
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.	
1882.....	58,000,000	9,000,000	18,000,000	1,500,000	4,500,000	1,000,000	92,000,000
1883.....	59,700,000	24,500,000	24,100,000	1,150,000	6,050,000	1,600,000	117,100,000
1884.....	68,440,000	37,500,000	25,000,000	2,000,000	4,500,000	2,850,000	140,290,000
Expected 1885...	75,000,000	46,000,000	26,000,000	1,500,000	4,500,000	.....	153,000,000

II. COMPARATIVE STATEMENT.

YEARS.	Production in the United States.	Increase in per cent.	Home consumption.	Export to Europe.	Stock on hand in ingots and furnace material.	New York price of Copper.	Price of Chili Bars, London.	Price of Best Selected English Copper reduced to cents.
					Dec. 31st.	Average.	Average.	Average.
	Pounds.		Pounds.	Pounds.	Pounds.	Cents	£	Cents
1882.....	92,000,000	..	77,000,000	5,000,000	23,000,000	18½	67	15¼
1883.....	117,000,000	27	77,000,000	40,000,000	23,000,000	16¾	63⅛	14⅜
1884.....	140,000,000	20	70,000,000	75,000,000	18,000,000	13¼	54½	12⅝
Estimated,						Present prices.		
1885.....	153,000,000	9⅛	77,000,000	75,000,000	19,000,000	11	47½	11
	Increase, 66 per cent in 4 years.						Parity.	

Statement II. shows that our increased production corresponded exactly with our export to Europe and a subsequent decline in prices on both sides of the Atlantic, leaving our stock in reserve almost intact.

The estimated production for 1885 is based on reliable information, leaving no doubt that the same, or even a greater, quantity must be exported in 1885 than was shipped in 1884, should our consumption for 1885 not increase 10 per cent.

The English and French consumption and exports from England were:

	Tons.	Or pounds.	Increase in per cent.
1881.....	112,700	252,450,060	.....
1882.....	113,000	253,120,000	.....
1883.....	121,500	272,160,000	7½
1884.....	136,700	306,208,000	13
	Increase in four years, 21 per cent.		

This statement of an increase of 13 per cent in the English and French consumption and export from England during 1884, would be most encouraging; but unfortunately, even if the English consumption for 1885 should further increase, the English export certainly will not. Already the English Board of Trade publishes returns showing that the export of copper fell off in January by 26,200 cwts., equal to three million pounds.

India was well filled with material in 1884. In France, the consumption in 1884 was 3000 tons less than in the preceding year, and there is evidently no chance for an improvement in French trade at present. In Germany, the consumption in 1884 has been larger, but was made up to a great extent by importations from England and the United States.

Latest advices state that the Mansfeld works have accumulated their entire stock of 33,000,000 pounds, which is yet unsold, but probably must be sold in 1885.

In reviewing the European conditions of the market, I find larger stocks held in England, France, and Germany, and a new source of supply, Japan, is looming up. One thousand tons of Japanese copper have already arrived in England, and 3000 tons more are afloat. Hence, I am unable to indorse those optimistic views recently entertained in several American circulars. Respectfully,

S. RAUNHEIM,
234 Pearl street, New York City.

OFFICIAL STATEMENTS AND REPORTS.

Lehigh Coal and Navigation Company.

Mr. Joseph S. Harris, President of this company, makes a favorable report for the operations of the year 1884, from which we make the following extracts:

REVENUE.

Lehigh & Susquehanna Railroad	$1,414,400.00
Panther Creek Railroad and Nesquehoning Tunnel	43,799.76
Lehigh Canal	77,443.75
Water powers	20,524.82
Delaware Division Canal	58,950.83
Profit on Lehigh Coal	370,101.50
Royalty on coal mined by lessees	4,441.41
Rents	36,530.87
Miscellaneous receipts	22,357.90
Total	$2,048,550.84

DISBURSEMENTS.

General and legal expenses	$58,460.34	
Rent and taxes Nesquehoning Valley Railroad Company	97,050.00	
Rent and taxes Delaware Division Canal	69,921.04	
Taxes	80,077.89	
Interest account	854,069.27	1,159,578.54
		$888,972.30
Less sinking fund of 10 cents per ton on 807,172 tons	80,717.20	
Less depreciation on coal improvements	76,026.16	156,743.36
Surplus for year		$732,228.94
Dividend of $1.50 per share on 232,350 shares paid June 11th, 1884	$348,525.00	
Dividend of $1.50 per share on 246,469 shares paid December 9th, 1884	369,703.50	718,228.50
Credited to dividend fund		$14,000.44

Concerning the mining operations, the report says:

"Our Lehigh coal lands continue to show an increased capacity, having produced for several consecutive months an average of 5300 tons per working day. The total output for the year was 958,844 tons, notwithstanding the great restriction found necessary throughout the anthracite region to keep down production to the requirement of the market—a restriction that necessitated the suspension of mining during a little more than one third of the working days of the year. In order to keep up the supply of coal from our property, it has become necessary to commence to make new openings, and two shafts are now being sunk to replace the present slopes at collieries Nos. 6 and 8. The former should reach the requisite depth this year, and should commence to yield coal in 1886, while the latter, the sinking of which has been but recently started, will be a year later in producing coal. It is probable that no further sinking will be required at either of these collieries for many years, as the two shafts will each develop a large field. The cost of coal shows a small decrease from that of last year, and is about the average of the last five years; but, owing to the great fall in the price realized during the latter months of the year, the net revenue from this source falls below that of 1883, though it is still larger than that of any other year since we resumed possession of our property in 1877."

It is much to be regretted that the report fails to state the cost of mining. As it is, stockholders have no means of comparing this cost with that of other companies, or of knowing whether it is excessive or not.

The managers have refunded a part of the company's indebtedness at the reduced rate of interest of 4½ per cent.

"Our first mortgage loan of $5,381,840.84 matured April 1st, 1884. Holders of $5,000,000 of this loan accepted the privilege of extension to July 1st, 1914, with interest at the reduced rate of four and one half per cent, and the holders of the remainder, $381,840.84, were paid at the maturity of the loan. By this operation, the interest charge on $5,000,000 was reduced $75,000 per annum, and the loan-holders received so good a security that it commands a rate considerably above par, notwithstanding the lessened rate of interest.

"On the 1st of September, 1884, the agreement with the stockholders of the Nesquehoning Valley Railroad Company which required us to pay them seven per cent dividends expired, and the option was offered them of receiving the par value of their holdings in cash, or of extending the period during which they should receive dividends for twenty years on condition of their accepting five per cent per annum. The large majority chose the latter alternative, and we bought the stock of those holders who preferred to sell it, and now hold $326,350 of that security. This change in the rate of Nesquehoning dividend reduced our fixed charges $26,000 per annum.

"To provide means for these payments, and to retire a portion of its floating debt, the Board of Managers decided to execute a general mortgage for $15,000,000, and $1,000,000 bonds, bearing interest at the rate of four and one half per cent, were issued and sold. This furnished means to buy up the unextended portions of the 1884 loan, and of the Nesquehoning Valley Railroad Company's stock, to pay off the last installment of the Delaware Division scrip, amounting to $113,639, and to reduce the floating debt about $216,000."

PURCHASE OF COAL LANDS.

With regard to the control of the Alliance Coal Company, the report says:

"This was done largely by the exchange of our stock for theirs, $650,400 of Lehigh Navigation stock being given for $975,600 of Alliance stock. By this purchase, we became possessed of about sixty-two per cent of the total share capital of the Alliance Coal Mining Company, which owns an unincumbered estate of 4097 acres in the same valley in which lie our Lehigh lands. The property, estimating our stock at its par value, cost us at the rate of $275 per acre for the lands, exclusive of improvements, which is a little more than we paid for our Kentucky Bank lands in 1882.

"The Alliance lands produced in 1884 118,423 tons of coal, and have now a productive capacity of about 20,000 tons per month. The coal is of fine quality, meets a very ready sale at good prices, and with the present development the mining should be a source of direct revenue. Our net revenue in 1884 from the transportation over our lines of the coal produced by these lands in their partially developed state was about

$60,000, and it should be considerably larger this year, and should continue to grow.

"A tract of land adjoining the Alliance estate, containing 224 acres, was purchased during the year for $65 per acre, one half of the purchase-money being paid in our stock at par. This tract, as well as the Alliance lands, contains a greater amount of coal per acre than our Lehigh lands, and it was only because as the coal lies at considerable depth, it was too small to be profitably worked by itself, that we were enabled to buy it at so low a rate.

BENEFIT FUND.

"During the year, an arrangement, which has been long contemplated, was carried out in the formation of a beneficial fund for the workingmen in our mining region. Under the plan adopted last year, the company contributes to the beneficial fund one cent for each ton of coal mined, and the operatives contribute, some one per cent and some one half of one per cent of their earnings. In case of injury, each one receives benefits at the rate of one half of his weekly wages during his disability. When the injury results in death, $30 is paid for his funeral expenses, and a weekly stipend equal to one half of the wages earned by the deceased is paid to his family for one year."

Manhattan Silver Mining Company, Austin, Nevada.

At the annual meeting of this company, the annual election resulted in the choice of the following directors: A. K. P. Harmon (President), E. B. Pond (Vice-President), M. Curtis, B. W. Paxton, C. E. Gibbs. John Crockett was re-elected Secretary and M. Curtis, Superintendent. There were represented 39,500 shares out of 50,000.

We make the following extracts from the annual report:

The receipts and disbursements during the year were as follows:

RECEIPTS.

From 5204 tons, assay, $231.50, value, $1,204,752.88 at 93·7046 per cent	$1,128,909.91	
Royalties collected on dump ores	1,788.57	
Gain—Losses of previous years collected	212,50	$1,130,910.98

DISBURSEMENTS.

Mining expenses:		
Lander shaft mines	$228,291.65	
Paxton Incline mines	147,362.75	
Isabella Incline mines	27,943.79	
Ruby Incline mines	33,014.30	
Frost compressor and pump shaft	46,063.69	
North Star pump shaft	2,329.85	
London Incline mines	2,819.52	
Silver Wedge mines	5,573.66	
Ward Incline mines	3,087.35	
Low-grade ores	9,129.43	
Lone Star mines	11,090.20	
Blue Incline mines	18,561.31	
Bowman Incline mines	4,273.48	
Great Eastern mines	3,362.61	
S. F. Tunnel mines	820.55	
Mining prospect	4,776.98	
Improvements, real estate and properties	68,878.55	
Milling expenses:		
Reducing 5204 tons at $25·392 per ton	132,140.58	
Furnace royalty on 4514½ tons at $1 per ton.	4,514.50	
Bullion discount:		
On Manhattan ores	182,175 29	
On custom ores (over-collections)	2,408 00	
Custom ores:		
Purchase of 471 tons	88,453.38	
Taxes	15,633.69	
Interest	887.49	
Exchange	6,501.45	
Expense	6,324.87	
Insurance	2,823.82	
Mill repairs	10,924.84	
Losses	2,531.00	1,072,662.60
Profit for year		$58,248.38

General improvements, consisting of the following items, were made:

Frost shaft	$2,418.90
" Tunnel	1,258.81
" Reservoir	955.20
" Pumps	42,188.68
Mine railroad	11,735.78
Lander shaft railroad	3,366.46
Machine-shop	959.08
	$62,882.91

LANDER SHAFT MINES.

"Until recently, nearly all the work done in these mines has been by day's pay. The Farrell ledge, on which much work was done previously, has been worked during the entire year. The main incline has been carried down to the 800 level of the shaft. Drifts were run from this incline at the 4th, 343 feet, and at the 5th level, 158 feet, west, to a connection with the Paxton incline. The greater part of the ground thus opened has been stoped out down to the 5th level. The remaining ground between the 5th and the 6th (or bottom) level is now being worked out by tributers. The 6th level was run a short distance west, but nothing being developed, and the ground being very wet, work was discontinued. But little ground now remains on this ledge that will justify working through this shaft.

"The Oregon ledge, below the 600-foot level, is being extensively worked. The 600 incline has been sunk to the 700 level; that level extended 567 feet west and connected with the 600 incline, and is being pushed still beyond that point. A body of high-grade ore was uncovered between the 600 and 700-foot levels, a large part of which has been stoped out, but considerable ground still remains to be worked. An incline has been sunk from the 700 level a distance of 260 feet to the 800 level, with which it connects. A drift has been started 75 feet below the 700, and run west 202 feet toward the body we are now working in the 700, and drifts below this will be run as required. The product of this ledge for the year was 343 tons, giving an assay value of $107,991.18. On the North Star ledge, 800-foot level, a drift was run east 331 feet, but, failing to find any bodies of ore, was discontinued. There were taken from this ledge during the year 50½ tons of ore; assay value, $17,704.09.

"The 800-foot cross-cut, started in 1883, was continued 973 feet to the Farrell ledge, on a level with the 6th or bottom level of the 600 or Farrell incline, which also corresponds with the 1800 level of the Paxton. From this point, a drift connects this cross-cut with the 1680 of the Paxton, through which all the water of the mines is conducted to the Frost pump and compressor shaft. This cross-cut has been continued 178 feet farther north, and has cut a portion of the Farrell ledge east of the break, which shows a good formation, but little ore. A chute has been started from this (800) level on the North Star ledge, to prospect the ground on that ledge, between this level and the old workings below the 500-foot level of the Oregon shaft, there being much ground at this point which has never been prospected.

"The work performed in these (Lander shaft mines), including tribute work, consists of 87,275 square feet of stopes or breasts, 2996 linear feet of drifts, 1658 feet of cross-cuts, 885 feet of inclines, and 323 feet of chutes.

"The total product was 2287½ tons of ore, assaying $262.72 per ton, and giving in bullion $561,034.98.

PAXTON INCLINE MINES.

"Most of the work done in these mines on company account was below the 1500-foot level. The 1580 and 1680 levels were run east 147 and 437 feet respectively, and connected with the Lander workings. The greatest portion of this ground was stoped out, and leasers are now breasting out the remainder.

"The 1450, 1500, 1580, and 1680 levels have been run west in the order named 205, 550, 344, and 215 feet, and the 1500 and 1680 are still continued. Considerable ore has been taken from these levels, but being found only in spots or bunches, it is more economical to lease the ground to tributers, and they are now working it. The 1500 west drift has reached the greatest distance in that direction, and carries bunches of excellent ore, which promise to lead to a well-defined chimney.

"At the 1800 level, a drift was run 337 feet east; but the ledge being very soft and the ground carrying a large amount of water, it was discontinued. A cross-cut was also run to prospect the ground north of the Farrell ledge; but not finding any thing, it was stopped, and the water was allowed to rise to the 1680 level, whence it runs through the Lander to the Frost shaft. On the 1500 level, a cross-cut has been run south 315 feet, cutting the Alabama ledge at 100 feet. This cross-cut will be continued until it cuts the Oregon ledge, which it will do at a point several hundred feet west of our present workings on the 700 of the Lander, and open a considerable quantity of ground that has never been prospected. The work in these mines (Paxton incline), including tribute work for the year, consists of 64,550 square feet of stopes, 3044 linear feet of drifts, 485 feet of cross-cuts, and 259 feet of incline. The product was 1151¼ tons, assaying $206.97 per ton, and yielding $223,645.85 in bullion.

RUBY INCLINE MINES.

"These mines are worked entirely on the tribute system. Much new ground was opened with, in some instances, very good results. There yet remains a large amount of unprospected ground accessible to tributers. The work for the year was the extraction of 12,300 square feet of stopes, 1078 feet of drifts, and the product 165½ tons of ore, assaying $341.56 per ton, and yielding $53,471.57 in bullion.

ISABELLA INCLINE MINES.

"These, like the Ruby mines, were worked entirely by tributers. The cross-cut started last year from the bottom of the incline was continued 287 feet north, cutting several ledges, but none showing much ore. It is still continued. A bunch of ore has recently been encountered in the 500 level, which promises well. The work accomplished was 9450 feet of stopes, 1336 feet of drifts, and the product 129 tons; assay, $287.68; bullion, $34,852.14.

LOW-GRADE ORES.

"The system adopted in the latter part of 1882 for working these ores has been continued since, with gratifying success, and is found to be the source of a reasonable profit as well as bringing in for reduction a large amount of ores that were previously thrown away, and enabling us to run the mill more regularly. Of these ores, there were worked during the year 667 tons, assaying $61.61 per ton, and yielding in bullion $39,050.63.

CUSTOM ORES.

"These are ores purchased from outside districts, and from mines in this vicinity in which the company has no interest. They amount for the year to 471 tons, assaying $270.66 per ton, and giving a bullion value of $120,600.29.

"The following mines are worked by lessees entirely, who furnish themselves with all supplies and material necessary, and pay the company from 10 to 20 per cent of their net product. The profits on each will be found by reference to statements herewith:

Ward Incline: Product, 28 tons; assay, $235.70; bullion, $6219.64.
Bowman Incline: Product, 29·3 tons; assay, $295.93; bullion, $8367.68.
London Incline: Product, 31·3 tons; assay, $214.46; bullion, $6544.55.
Blue Incline: Product, 116 tons; assay, $327.23; bullion, $35,793.33.
Great Eastern: Product, 34 tons; assay, $227.90; bullion, $7025.62.
Lone Star: Product, 41·2 tons; assay, $499.07; bullion, $19,530.59.
Silver Wedge: Product, 32·3 tons; assay, $363.48; bullion, $11,158.63.
S. F. Tunnel: Product, 8·1 tons; assay, $229.27; bullion, $1644.41.

GENERAL REMARKS.

"The Farrell ledge, from which so much ore has been taken in the past, has now been worked to the 1800-foot level of the Paxton incline and 800-foot level of the Lander shaft—these levels corresponding in depth—and very little ground remains, and that is worked by tributers. The ground west of the Paxton incline that we are now prospecting has thus far failed to show continuous bodies of ore, and unless some new chimney should be discovered, it can not be counted on to produce much ore in the future. The Oregon ledge, although it has produced considerable high-grade ore, has not shown as large a chimney as we expected in Lander shaft, from first developments on 600 level. It is now followed below the 700 level, but enough work has not been done to judge of its extent below this level. The 700 west drift is continued in hopes of finding another body in that direction, as there is a large extent of unprospected ground west. Although the prospects for the coming year

are not as bright as for the past, it is possible that, by opening new mines and pursuing a systematic course of prospecting, new bodies of ore may be found that will bring our production up to the usual standard.

"MELVILLE CURTIS, Superintendent."

Quincy Mining Company, Michigan.

From advance-sheets of the Quincy Mining Company's report for 1884, which have been courteously sent us, we make the following extracts:

"The shipment of the season was 6,849,040 pounds of mineral, which has been smelted at Detroit, and yielded about 82½ per cent, or 5,650,436 pounds of refined copper.

"The product of the mine, as prepared for shipment, was 6,885,200 pounds, or 3442$\frac{1200}{2000}$ tons of mineral, of the following description, namely:

	Pounds.
Stamp copper	6,490,185
Mass copper	395,015
	6,885,200
For which, estimating copper on hand, unsold, at 10 cents a pound, and the product left over at the mine at 82 per cent yield, has been realized the gross sum of	$692,360.63
Realized from sale of silver	3,638.01
	$695,998.64

Two dividends, aggregating $200,000, or $5 a share, were paid during the year.

The following is a summary of the agent's report for the year:

Average force employed	427 men.
" number of miners	157 men.
" wages of miners on contract, per month	$43.35
Yield of mineral per fathom of ground broken	880 pounds.
" refined copper per fathom of ground broken	722 pounds.
Total rock mined	140,705 tons.
" rock hoisted	102,180 tons.
" stamp rock treated	99,196 tons.
Yield of rock stamped ·03·27 per cent	6,490,185 pounds.
Product, mineral	6,885,200 pounds.
" refined copper	5,680,087 pounds.

The record of this great mine is summarized as follows:

GENERAL SUMMARY OF RECEIPTS AND EXPENDITURES OF THE QUINCY MINING COMPANY, FROM ITS ORGANIZATION TO DECEMBER 31ST, 1884.

EXPENDITURES.

For expenditure on location previous to 1856	$12,097 98
Expenditure on Quincy vein, 1858, not now worked	55,000.00
Openings and explorations on 3800 feet "east" or Pewabic vein, extending to Portage Lake, preparatory to future work	11,500.00
Real estate and permanent improvements on same, including dwelling-houses, stamp-mill, machinery, steam engines, tram-road, dock warehouse, and other buildings and roads	897,116.52
Mining and surface labor, expenses of smelting and marketing copper, and all incidental expenses	11,134,421.55
Balance carried down	4,507,346.68
	$16,647,482.73

RECEIPTS.

From capital stock paid in	$200,000.00
Proceeds copper and silver (76,471,878 pounds copper)	16,209,973.35
Interest	103,481.79
Profit on sale P. L. & R. Improvement Company stock and other investments	79,637 16
Sales of real estate, Hancock, Michigan	54,390.43
	$16,647,482 73
By balance brought down, being receipts over expenditures	4,507,346.68
Deducting dividends declared, Nos. 1 to 32, inclusive	3,990,000.00
Leaves balance	$517,346.68

CONDITION OF CARBON IN STEEL.

A report of a committee to the English Institution of Mechanical Engineers states that the results of the many experiments made appear to warrant the following conclusions in regard to characteristics, recognizable by chemical examination, that are exhibited by different portions of one and the same sample of steel presenting marked physical differences consequent upon their exposure to the hardening, annealing, or tempering processes.

1. In annealed steel, the carbon exists entirely, or nearly so, in the form of a carbide of iron, of uniform composition (Fe_3C or a multiple thereof), uniformly diffused through the mass of metallic iron.

2. The cold-rolled samples of steel examined were closely similar in this respect to the annealed steel, doubtless because of their having been annealed between the rollings.

3. In hardened steel, the sudden lowering of the temperature from a high red heat appears to have the effect of preventing or arresting the separation of the carbon, as a definite carbide, from the mass of the iron in which it exists in combination; its condition in the metal being, at any rate mainly, the same as when the steel is in a fused state. The presence of a small and variable proportion of Fe_3C in hardened steel is probably due to the unavoidable and variable extent of imperfection or want of suddenness of the hardening operation; so that, in some slight and variable degree, the change due to annealing takes place prior to the fixing of the carbon by the hardening process.

4. In tempered steel, the condition of the carbon is intermediate between that of hardened and of annealed steel. The maintenance of hardened steel in a moderately heated state causes a gradual separation (within the mass) of the carbide molecules, the extent of which is regulated by the degree of heating, so that the metal gradually approaches in character to the annealed condition; but even in the best result obtained with blue-tempered steel, that approach, as indicated by the proportion of separated carbide, is not more than about half-way toward the condition of annealed steel.

5. The carbide separated by chemical treatment from blue and straw tempered steel has the same composition as that obtained from annealed steel.

THE new Caledonia nickel is now made malleable by adding a small quantity of magnesium.

THE NEW YORK MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.—II.

Through the courtesy of the trustees of Columbia College,

THE LAST SESSION

of the meeting was held in one of the lecture-rooms of the School of Mines. After the election of 43 new members and 17 associates, Mr. T. F. Witherbee, of Port Henry, New York, presented a paper entitled,

REMOVING OBSTRUCTIONS FROM BLAST-FURNACE HEARTHS AND BOSHES.

Mr. Witherbee has had a good deal of experience in dealing with blast-furnace obstructions, and deserves the credit of having introduced the use of explosives, now an accepted method in American practice. His present contribution to the subject deals principally with the use of a kerosene or hydrocarbon blow-pipe flame as an expedient to perforate the contents of a blast-furnace hearth where for some reason explosives can not be applied. In the form in which it was first introduced into the Lake Champlain district by Mr. Charles H. Foote, the apparatus consisted of several pieces of gas-pipe, united by elbows to make it flexible. One end of this pipe is connected with a tuyere stock, while the other is brought to bear upon the place to be melted out. A quarter-inch pipe, provided with valves, leads from the last length to a reservoir filled with crude oil, placed near enough to overcome the blast pressure. In all cases, the oil must be admitted far enough from the outlet of the blow-pipe to insure its complete vaporization. A surprisingly small quantity of oil will, with a good hot blast, melt large obstructions in the hearth of a blast-furnace. Mr. Witherbee described the different ways of applying the general principle. Thus, in operating on a chilled hearth, a good method is to open up a hole from a cinder or iron notch to the nose of the most convenient tuyere, and make a blow-pipe of the latter by turning the oil into its belly pipe. He recommends it for opening tuyeres, water blocks, and in tapping iron or cinder notches that it is not possible to drill. When the mass to be operated on is cold or projecting, a good plan is to cause the gas to pass through a fire-brick arch or tunnel to get a reverberatory effect.

Mr. Witherbee, to illustrate how "getting a hole up through" is occasionally over-done, quotes the following experience at the Cedar Point furnace three years ago. The cross-head of the blowing-engine breaker, and incidentally also two guides and housings, eight gibs, and the cap across the guides were broken, and a reverse curve was put into the steam piston-rod. It took two weeks to repair the damage. Meanwhile the bronze tuyeres had been taken out, all water had been shut off, and every thing made as tight as possible, after casting seven beds of iron and draining the crucible of cinder as well as possible. The furnace was at the time using all anthracite, making over 60 tons of Nos. 1 and 2 iron, with a heavy burden, and blowing at a pressure of 12 pounds of blast. When after fourteen days' stoppage, the iron notch was opened, the hearth was found to be full of coal alone at a dull red heat, which hightened as the air drew in.

The plan outlined was to rake out the coal to make room for cinder and iron as soon as melted, hold the cinder in as long as possible, and then, by exploding a cartridge of Atlas powder, to let it down and out of the iron notch. This was done, the third cartridge bringing a lot of musty stuff to the iron notch, where it chilled. The next attempt was made at a cinder notch, and one good run of cinder and white iron was got out, the first and last for several days. All the tuyeres then soon closed up. Both Atlas powder and the blow-pipe were used in getting holes into the crucible, and in time large quantities of loose stock were taken out, but the mass adhering to the sides refused to leave. On the seventh day after the blast had been put on, the true condition of the furnace was discovered. On measuring through the central wall, a hole 45 feet deep was found, while at the sides the stock was 24 feet from the top. The hole was filled with 67 tons of coal and coke, to bring the middle even with the sides, when regular charging was resumed and the trouble soon came to an end. Mr. Witherbee believes that such cases of burning up through the center are of not very rare occurrence, and that they are indicated to a greater or less degree by an abnormally hot top. He advises, under such conditions, to fill up with fuel, drive in the wind and melt out the ring.

A paper, prepared jointly by Messrs. N. Lilienberg and George Dwight, was read, being

A DESCRIPTION OF AN OPEN-HEARTH FURNACE AND PRODUCER FOR WATER-GAS.

It was followed with a good deal of interest, being the first design yet submitted for utilizing a fuel that many consider the metallurgical fuel of the future.

The design includes two circular overground producers, so constructed that the ash-pit is free from obstructions, and can be cleaned through four doors. This is regarded as an important feature, because, as the ashes are partly melted by the blast, and cooled afterward by the steam, there is a tendency toward forming large lumps. The arrangements for reversing are well worked out by operating two systems of levers. The distinctive feature of the design, however, is, that the principle of continuous regeneration by radiation through brick-work is adopted. The drawbacks of plans thus far tried to carry out this principle it is sought to avoid by making the heat restorer low, thus providing against the danger of leakage arising from unequal expansion and contraction. As to the temperatures obtainable, Mr. Lilienberg instanced the fact that at Essen cold water-gas taken from a gas-holder for illuminating purposes and ignited with slightly preheated air, created a sufficient heat to melt soft boiler plate.

An animated discussion in which a number of objections were raised, was participated in by Messrs. Egleston, Howe, Hunt, Durfee, and others, which was followed by a paper by Mr. L. G. Laureau, of New York, on

A PLAN FOR A BESSEMER CONVERTING-HOUSE WITHOUT CASTING-PIT.

Fully appreciating the necessity of solving the problem of making the work usually performed in and around the casting-pit of a converter less dangerous to the men and less costly to the management, Mr. Laureau has devised a plan, the principle of which is to cast the ingots into molds placed on cars. These cars are so constructed that all subsequent operations, such as stripping and putting back into place may be done auto-

matically or by easily handled machinery. The use of mold cars would make it possible to entirely suppress the pit and the ingot cranes, and to carry all the operations of casting, cleaning, ladle changing, etc., on the general level. The whole pit force necessary is one man at the ladle and two men to stop the molds. When the ingots are cast upon the car, they are handled by means of an hydraulic cylinder, a wire rope and drum, tipping the ingots and stripping them. Mr. Laureau presented a number of different arrangements for doing the work practically automatically, which it would be impossible to explain in the absence of drawings.

In the discussion of the paper, Mr. R. W. Hunt approved of some of the features submitted, under certain conditions.

Professor Egleston announced the death of Mr. Sidney Gilchrist Thomas, the inventor of the basic process. Mr. G. A. Maynard, who was one of the first to recognize the importance of this invention, and who was closely associated with Mr. Thomas, described the early history of its introduction to the metallurgical world.

The following papers were then read by title:

A New System of Ore-Sampling, by D. W. Brunton, Denver, Colo. (Published in the opposite column.)

The Iron Ore Range of the Santiago District of Cuba, by J. P. Kimball, Bethlehem, Pa.

Notes on the Treatment of Nickel and Cobalt Mattes at Mine la Motte, Mo., by James M. Neill, Mine la Motte, Mo. (Published last week in this JOURNAL.)

The Patience of Copper and Silver, as Affected by Annealing, by H. M. Howe, Boston, Mass.

Hematite of Franklin County, Vt., by Alfred F. Brainerd, St. Alban's, Vermont.

Combined Concentration and Amalgamation, by Walter McDermott, New York City.

Note on the Occurrence of Nickel and Cobalt in Nevada, by A. D. Hodges, Jr., Roxbury, Mass.

The New Mining Law of Mexico, by Richard E. Chism, Saltillo, Coahuila, Mexico.

The Cause of Hard Centers in Steel Ingots, by R. Gatewood, Washington, D. C.

Certain Interesting Crystalline Alloys, by Richard Pearce. Denver, Colo.

Geology of the La Plata Mountains, Colorado, by H. C. Freeman, Alto Pass, Ill.

The Durham Blast-Furnace, by B. F. Fackenthal, Jr., Riegelsville, Pa.

Biographical Notice of the late Sidney Gilchrist Thomas, by G. W. Maynard, New York City.

Dr. R. W. Raymond, the Secretary, presented the report of the Council. The financial statement showed the receipts for the year from all sources, including balance, to have been $19,052.36, and expenditures of $17,384.47, leaving a balance of $1667.89. Since the balance from the last annual statement was $3711.96, the receipts for the year were $2044.07 less than the expenditures. The latter, however, included the index of Volumes I. to X., the Holley Memorial volume, representing together an expenditure of $1897, furthermore anticipated payments on storage and paper, the expenses of moving from Easton to New York, and the earlier publication, by three months, of the 12th volume, and the payment of the greater part of the expenses on the 13th. The Council estimates that in all, these extraordinary expenditures amount to $4700.

The present membership includes 5 honorary members, 48 foreign members, 1207 members, and 155 associates; a total of 1415.

The scrutineers announced the result of the election as follows:

President, James C. Bayles.

Vice-Presidents: C. A. Stetefeldt, John Fulton, Richard Pearce.

Managers: C. A. Ashburner, W. E. C. Coxe, E. Gybbon Spilsbury.

Treasurer, Theodore D. Rand.

Secretary, Dr. R. W. Raymond.

After instructing the Secretary to convey to the New York members, and to those who had entertained the Institute, the appreciation of the visiting members of their courtesy and attentions, the meeting adjourned.

New South Wales Coal Mines.—At the close of 1883, there were fifty coal mines, employing 5481 men: the quantity of coal raised being 2,521,457 tons, valued at £1,201,941 12s. 11d.

South African Diamonds.—The official return of rough and uncut diamonds exported from the Kimberley Division of the Cape of Good Hope during November, 1884, states that their weight in carats was 212,098$\frac{11}{16}$, and their declared value £246,855.

Blast-Furnaces in Great Britain.—At the end of 1884, there were 615 blast-furnaces in England, 151 in Wales, and 143 in Scotland; total, 909; while there were in blast 317 in England, 49 in Wales, and 93 in Scotland; total, 459.

A New Dredging-Machine.—At the Mare Island Navy Yard, at San Francisco, may be seen an ingenious dredging apparatus, actuated by the tidal current of Mare Island Straits, and performing some very good work at a nominal cost. The mud having collected along the front of the island, and there being no appropriation for dredging, Mr. C. C. Wolcott, the engineer, adopted the following plan to remove the accumulations: A framework suitably braced, and having floats at each end, was furnished at one end with an undershot wheel some 20 feet in diameter, with broad buckets. A spur-wheel on the inner end meshes with the gears on two drums. These carry double ropes, and between each pair of ropes are placed small buckets. At the inner end of the raft, are corresponding loose pulleys, arranged so as to be submerged and dropped into the mud alongside. The endless ropes from the outer drums pass around these pulleys. The current actuates the large water-wheel, which revolves the drums, moving the endless ropes, with their buckets, so that the buckets pass down into the mud, are filled and then pass out to the outer end near the wheel. Before reaching their outer position, they meet the swiftly moving current, which washes the mud from them and bears it away to places where it is not in the way. Owing to the swift current, the work has been going on very satisfactorily for some time. The cost of construction was about $500.

A NEW SYSTEM OF ORE-SAMPLING.*

By D. W. Brunton, Denver, Colorado.

The erection of large metallurgical establishments for the treatment of gold, silver, copper, and lead ores, at railroad and geographical centers, where fuel and fluxes, together with proper ore-mixtures, can be cheaply and constantly obtained at all seasons of the year, has led to the very general introduction of a system of ore-handling known as "public sampling." By this system, the ore, instead of being shipped directly to the mill or smelter, is sent to a public sampler, where it is crushed and sampled. Guaranteed samples are sent to the different metallurgical establishments, and the ore is then sold to the highest bidder.

Though differing in many respects from the English system of "ticketing," the underlying principle is nearly the same, while the greater rapidity with which a lot of ore can be disposed of renders the American system infinitely better adapted to the requirements of the West.

The steadily increasing practice of leasing mines to working miners has also given a great impetus to the system of public sampling. Where mining is carried on by large companies that can afford to keep at the metallurgical establishments where the ores are treated an agent to watch the sampling and make settlements, the advantages of public sampling are not so marked; but where mines are leased to small parties of working miners, who will never combine together or employ a common agent the public sampler meets their requirements fully, and renders the presence of the owner at the valuation and sale of the ore wholly unnecessary. Upon the whole, the system is a decided benefit, even to the buyer. When the sampling and assaying are performed by a third party, the former endless disputes between the miner and the smelter are no longer possible. Again, metallurgical establishments have heretofore been almost compelled to receive all the ore sent them, whether desirable or otherwise; but under the new system, they need only bid upon such ores as are required in their mixtures; the larger variety of ores from which they have to select more than compensating for the increased cost.

Before the introduction of public sampling, the ore, after being crushed, was generally sampled by hand, either by taking every fifth or tenth shovelful by "quartering," or by the "split shovel."

Since large quantities of ore have now to be handled, and close competition has made cheaper methods of work an absolute necessity, mechanical sampling, in some form or other, has become almost universal. While the devices employed for this purpose exhibit an almost infinite variety of type, yet they all work upon the same general principles, namely, by dividing or cutting out from a falling stream of ore, by means of narrow spouts, dividing flanges or traveling buckets, a certain percentage, which is taken to represent an average sample of the whole.

Many of the samplers exhibit a vast amount of ingenuity, and upon dry ore, crushed and screened to a uniform size, and perfectly free from strings, chips, rocks, etc., some of them will yield perfectly accurate results.

Unfortunately, however, these conditions are rarely realized in practice; and the result has been, that both sellers and buyers have very often insisted on checking the work by means of hand-sampling. Even if the above objections did not occur, many of the samples would still give inaccurate results; since a stream of falling ore, either in a vertical or in an inclined spout, is never entirely homogeneous in all its parts, there being a constant tendency to a greater proportion of coarse, rapidly traveling particles in the center of the stream, and an excess of finer, slower-moving particles on the edges. Consequently no part of the stream would exactly represent the average of the whole.

Again, where intercepting buckets are used, the coarse, heavy particles often rebound from the buckets and fall into the rejected ore, thereby rendering the sample inaccurate. Even the fine crushing and accurate sizing required by the best of these devices is a decided objection, if the ore is to be afterward treated in a shaft-furnace, where an undue proportion of fine stuff not only increases the loss in dust, but materially reduces the daily capacity of the furnace.

About a year ago, the writer's attention was directed to these facts by one of the largest ore-dealers in the West, with a request that he would investigate the matter and devise some method that would yield accurate results, satisfactory to both the miner and the smelter, and at the same time permit the sampling of ore with extreme rapidity and at the lowest possible expense for attention and repairs.

After examining into the matter for some time, and taking into consideration the marked preference of the principal ore-buyers for coarse ore, the writer decided that it would be necessary, on account of the objections already mentioned, to avoid splitting or dividing the falling stream, and, instead of dividing the ore, to make the division one of time—something that could be divided with exactitude and to infinity. With the new machine, the sample is obtained by deflecting the entire stream, alternately to the right and to the left, the relative proportions of these two divisions to each other being determined by the difference in time between the deflections to the right and the deflections to the left.

The construction and operation of the machine will be readily understood from the accompanying drawings, in which *C* is a vertical or inclined spout, containing a falling stream of ore; *B* is a funnel for narrowing the width of the falling stream, so as to reduce to a minimum the necessary travel of the deflecting chute *A*. This chute *A* is pivoted upon the rock-shaft *K*. When it is deflected to the right, the entire stream of ore is thrown into *E*; and when it is deflected to the left, the entire stream is thrown into *D*.

The deflection is caused by the movement of the crank *O* receiving its motion from the driving-bar *I*, and connected with it by the pitman *J*.

The driving-bar *I* receives its motion from the pins *L* in the face of the revolving wheel *H*, which is driven by the pulley *G*, receiving motion from a line-shaft through the belt *M*. The face of the wheel *H* is perforated with two rows of holes, the distance between the two rows being the same as the necessary movement of the crank *O*. In these holes, are inserted a number of pins *L*, held in place by jam-nuts on the interior of the wheel-face. Preferably, twenty holes are bored in each row,

* A paper read at the New York Meeting of the American Institute of Mining Engineers, February, 1885.

each hole or pin representing five per cent of the time necessary for a complete revolution of the wheel.

Now, if fifty per cent of the pins are placed in the right-hand row of holes, and fifty per cent in the left, then the revolution of the wheel *H*, carrying the pins *L* through the guides *N N*, on the driving-bar *I*, will hold the deflecting chute *A* on the right during one half of the revolution, and on the left during the other half, thus dividing the stream into two equal portions.

If twenty per cent of the pins are placed in the right-hand row, and eighty per cent in the left, then the deflecting chute *A* will be held on the right during one fifth of a revolution and on the left during four fifths, thus throwing twenty per cent of the ore into the spout *E*, and eighty per cent into the spout *D*, etc.

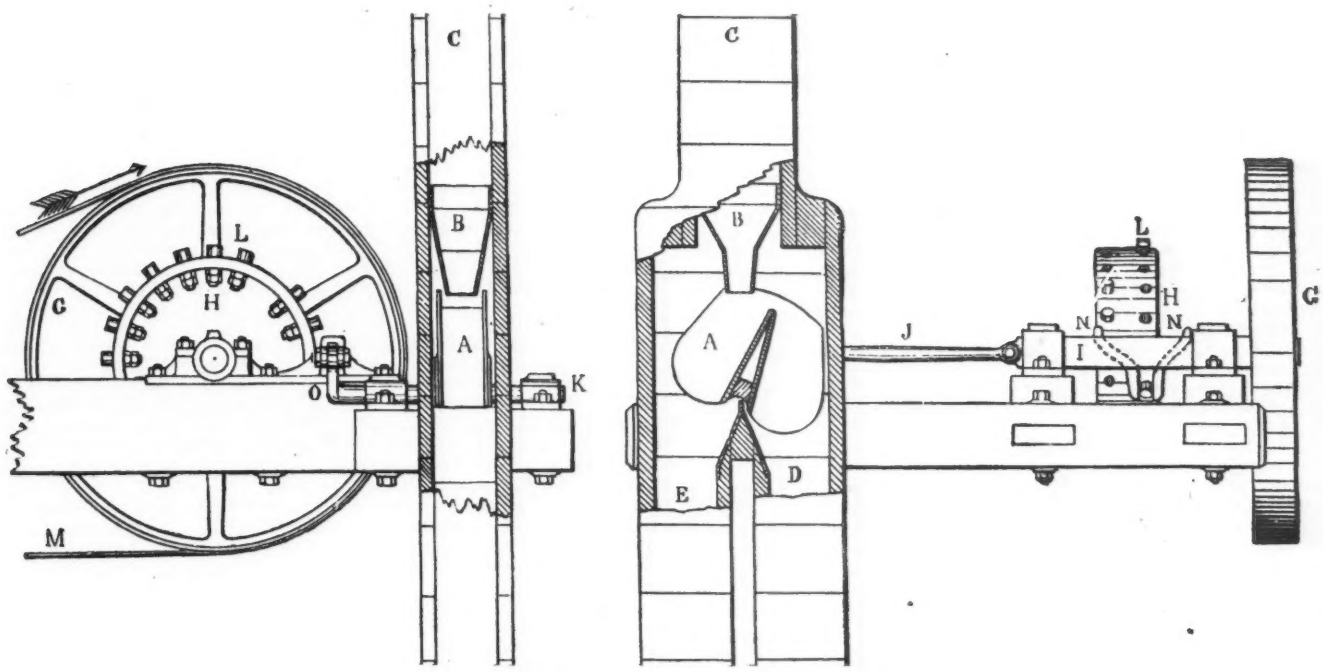
In practice, the wheel *H* is driven with considerable velocity, so as to make the divisions of time as minute as is practicable without injuring the machine by excessive vibration.

In improved machines now building, although the principle is identical with the above, the construction is somewhat different. Sliding motion, always objectionable in dusty situations, is wholly avoided, and the pin-wheel *H* is inclosed in a tight iron case, filled with oil. This arrangement, while far from complicated, is exceedingly compact, the journals, wheel, case, and frame being in one casting; but, owing to the position of the different parts, it is very difficult to explain by cuts; hence the employment of the other drawings in the foregoing description.

When in use, the machine runs noiselessly, without either jar or vibration, and never clogs, no matter how wet or how full of chips, rocks, and strings the ore may be.

Two of these machines have been running steadily for the past six months, during which time they have given complete satisfaction to seller, sampler, and buyer. No errors in sampling have ever occurred, even upon the richest ores. Not a cent has been spent upon either alterations or repairs, and the attention bestowed upon the machine has been restricted to a daily oiling.

As the stream of ore is neither split nor divided, fine crushing on large



A NEW SYSTEM OF ORE-SAMPLING.

samples is entirely unnecessary. After the ore has been broken in a Blake or Dodge crusher, it falls into an elevator, and is raised a few feet above the level of the storage-bins. The sampler is placed between the elevator-discharge and the top of the bin, so that the ore falls through the divider, which throws out, for a sample, any amount per cent to which the machine may be set.

In practice, this amount varies from ten to fifty per cent, according to the value of the ore; the richer and more "spotted" the mineral, the larger the sample that should be taken.

The rejected ore drops directly into the storage-bins, while the sample falls through a spout into a pair of rolls placed on the same level as the breaker.

With most ores, from ten to twenty per cent has been found to be amply sufficient for a coarse sample; and as at least eighty per cent of the entire lot is generally sent to the smelter as it comes from the breaker, there is no objection to setting the rolls close, especially as they only crush from one tenth to one third of the amount of ore handled.

After being crushed fine by the rolls, the sample is raised by a small elevator to the same level as at first, and drops through a second divider, set to take any desired amount per cent.

The rejected ore falls into the bin with the ore from which it was at first separated, and the final sample drops into a closed and locked bin on the working-floor below.

On ordinary ores, 10 per cent of 20 per cent, or 2 per cent of the original quantity, is an all-sufficient sample; while on the richer rock, 15 per cent of 30 per cent, or 4½ per cent of the original quantity, is perfectly safe. By this plan only a small proportion of the ore is crushed fine—a very decided advantage for smelting purposes over all of the other systems, which require that the ore must be rolled before a sample can be taken.

The two machines are driven at different speeds, to prevent any possible error that might arise from isochronal motion. In testing these machines by re-sampling lots of ore, it has been found that the limit of error is less than one half of one per cent, while even the best "hand-quartering" often varies as much as two per cent.

The weight of the sample actually taken, even on the largest lots, never varies more than a few pounds from the percentage to which the machines are set. As the division is one of *time*, not of *ore*, it follows that the machines will take the percentage to which they are set, whether the ore passing through them be wet or dry, light or heavy, coarse or fine. This fact is of the utmost importance to the sampler, as it enables him to obtain a correct sample of intended mixtures, by simply passing the different lots through the crushing machinery in succession. Not only will the ore delivered in the sample-bin represent an exact average of each lot, but the amounts taken will bear the same relative proportion to each other as did the original lots, and the entire sample will consequently represent an exact average of the whole.

Under this system, the cost of sampling is reduced to the lowest possible limit, the principal and almost only items of expense being power and the cost of wheeling ore into the rock-breakers; and since the accuracy of the samples is in no way dependent upon the skill of the workman, the very cheapest labor may be profitably employed.

Many other advantages might be enumerated; but the writer hopes enough has been said to explain clearly the system and enable any one interested to judge fully its adaptability and value.

HEATING BY RADIATION AT HIGH TEMPERATURES.*

By John Head, F.G.S.

In the economical application of heat, three important points have to be considered: First, that the combustion should be perfect; second, that the intensity or temperature of the flame should be increased to the very highest degree; and third, that this intense temperature having been attained, it should be utilized in two distinct stages or periods, namely, by radiation within the furnace proper and by conduction and convection within the regenerators.

In order that combustion may be perfect, it is almost absolutely necessary that gas should be the fuel employed. The gas and air may be supplied in the exact proportions necessary to produce chemical combination or perfect combustion, and by this means the highest temperature is attainable of which the available fuel is capable in a large or open space. This is not so, however, within a closed space in which the gases have not room to combine without coming in contact with its limiting boundaries, for in this case smoke would be produced and soot deposited upon the surfaces.

It is upon the importance of the third point, that of applying heat through radiation at one stage and heat by conduction at another stage of the total heating, that it is now intended to lay stress. During the first or active stage, the whole of the heat is developed by the essentially chemical process of the combination of gas with air, and at this stage it is necessary that the flame should be kept absolutely free from contact with any solid substance whatever, so that it may both produce and radiate its heat freely. In the second or neutral stage, on the contrary, the products of combustion should be brought into the most intimate contact with the surfaces to be heated, because they do not injure the substances upon which they impinge by chemical or physical action, but heat them in the most effectual manner by direct contact.

DESIGNING FURNACES.

In designing furnaces so that the flame shall not come into contact with any portion of their structure, it is evident that they must be of very large proportions, Mr. Siemens maintaining that they can not be

* Read before the South Staffordshire Institute of Iron and Steel-Works Managers, January 10th, 1885.

made too large from an economical point of view, the radiation from a body of flame increasing in a much greater ratio than the increase on its area. This is at once evident when it is remembered that a flame radiates from every point within it, and upon its surface in every direction; that is, from every point of its whole volume, while the external walls and roof of the furnace, being formed of solid substance, only radiate from their outer surfaces, so that it may be laid down as an axiom that the loss of heat from a furnace into the external atmosphere only increases in the same measure as its increase of dimensions, while the production of heat increases in a square ratio. But besides the increased production of heat due to perfect combustion within furnace-chambers of large proportions, the furnaces themselves last much longer, owing to the flame not impinging upon and so destroying the material of which they are composed, while, for the same reason, there is less oxidation of the material heated or melted upon the furnace-bed. Having thus dealt generally with the theory of the subject and the advantages obtained by its application, it is proposed to refer specially to the modifications that it is necessary to introduce in the design of the furnace in order to bring about these effects, and to conclude with a description of some special applications that have already been carried out and others that are now making.

In designing the regenerative gas-furnace, in which radiant heat is to work to the best advantage, it is necessary that the gas and air-ports shall open at some distance below the roof of the melting-chamber, and at some distance also from the side walls, so that the inflowing gas and air may have unobstructed space after ignition for entering into combustion, and for the free development of the flame. For the same and other reasons, the flame is kept as much as possible out of contact with the material on the surface bed, and when these are crucibles, ingots, blooms, or packets of iron, they should be so placed that the radiant heat may play freely upon and about them.

In constructing furnaces according to this new method of heating, the air inlet may be arranged above the gas inlet, thus forming two parallel horizontal ports for the delivery of the gas and air in broad streams into the furnace-chamber, the inflowing air overlapping the gas at each side; or the gas and air may be brought into the furnace-chambers in several streams, side by side, the air-ports, which are more numerous than the gas-ports, being also placed at a higher level than the latter; or, again, as shown in connection with a crucible steel melting-furnace, in which, as the length of travel of the flame is comparatively short, the gas is brought into the chamber by two ports, having an air-port between them, and additional air-ports on each side, the ignition commencing as soon as the air and gas, which are delivered in thin streams, reach the hight at which the flame is to travel across the furnace from end to end. This arrangement is one that could be applied in other cases, where, on account of the shortness of the melting-chamber, the air and gas have to be well mixed on ignition, to secure complete combustion, before their exit at the other end of the furnace. In cases in which there is a great length of travel for the flame, the ignition is retarded by means of a horizontal wall or tongue, so that it shall only take place at the entrance of the gas and air into the furnace-chamber, and the combustion may be extended throughout the furnace, the flame in this case taking a semicircular or horseshoe course.

This new system of applying heat within the modified regenerative gas-furnace has now been employed for a sufficiently long period to establish the economy of the method as well in regard to the fuel used as to the material of which the furnace is constructed, and that treated upon its hearth.

FOR OPEN-HEARTH FURNACES.

One of the latest and most interesting applications has been to the open-hearth steel melting-furnace. At the Landore Works, the furnaces which were altered this time last year are still at work, a result entirely unprecedented in this class of furnace, which, as is well known, is worked at the very highest temperature employed in the arts. But besides the longevity of the furnaces, they are found to work more uniformly, while the yield is larger, owing to there being less oxidation of the metal, as is proved by more ore being used per ton of pig-iron, in order to decarburize it to the same extent. The furnaces work much more uniformly, and with great economy as regards consumption of fuel. Various other steel-works throughout the country, and several glass-works, are now modifying their furnaces, so as to obtain the benefits offered by this new method of heating, which will be found to be advantageous also, where steel is proposed to be made from inferior brands of pig-iron, by the adoption of a basic lining.

FORGE, MILL, AND PUDDLING-FURNACES.

Another important application of this method of heating is to forge, mill, and puddling furnaces, as, owing to the absence of contact between the flame and the materials with which the furnace is charged, a great reduction in the loss of metal, which has hitherto occurred through oxidation, will be effected.

In steel re-heating furnaces, contact of the flame with the ingots produces red-shortness in the metal, exhibiting itself in fissures, particularly at the corners of the ingots or blooms, when these are subjected to treatment either under the hammers or in the rolls. The removal of the injured portions involves a stoppage of the operations, resulting in a waste not only of material, but of time also, and occasionally rendering the blooms entirely useless for the purposes intended. In the radiation furnace, this cause of loss will no longer exist, while there will also be a saving due to non-oxidation of the metal.

In iron re-heating furnaces, the gain in metal will be much more considerable than in furnaces for the re-heating of steel, owing to the higher temperature at which they are worked, and the metal will weld much more easily, as it is heated out of contact with flame. These furnaces should be made as long as convenient, in order to obtain as much room for the development of the flame as possible, and for placing the ingots, blooms, or packets sufficiently far apart to allow the radiant heat to reach them on all sides.

In applying this new method of heating to puddling, it might be advantageous to erect a furnace containing a number of pans that could either be placed in two rows, the men working at each face of the furnace, or the men could work all on one face by constructing the furnace of a horseshoe form.

In the same manner, a furnace heated by radiation from flame may be constructed of such size and productive capacity that it may serve for heating all the metal for a mill or forge, or at any rate two or three such furnaces should suffice for the output of several hundred tons of metal per day, the only consideration being the convenient location of the furnaces with regard to the position of the mills and hammers.

In heating-furnaces, constructed and worked as hitherto, by contact of flame with the metal to be heated, the furnaces must necessarily be made as small as possible; for the flame, under such conditions, parts with its useful heat in a run of a few feet; after which, the sooner it leaves the furnace the better. But when heating by radiation is adopted, the conditions will be quite changed; for the flame, not being brought into contact with surrounding objects (including the metal to be heated), will be kept at a uniform temperature throughout its course, radiating all the time the maximum heat required for the charge in the furnace; and when combustion has ceased, the hot gases will be deprived of their heat by the regenerators.

Bearing in mind that contact of flame with the metal to be heated is avoided, there is no reason why a heating-furnace should not hold at the same time piles, blooms, or ingots in various stages of heating, from cold metal to metal that is ready for the hammers or mills. Each individual bloom, pile, or ingot will, under such conditions, take up from the heat radiated by the flame only the amount that it is susceptible of receiving without interfering with its neighbor; but, as mentioned at the beginning of this paper, the blooms, piles, or ingots must be placed sufficiently far apart to allow the radiant heat to reach them from all sides.

The new method of heating by radiation from flame thus offers the solution to one objection that has sometimes been made against the regenerative gas-furnace on the ground of its great cost, which has certainly limited its application for heating-furnaces in this country; but when a few furnaces—or perhaps one furnace only—are built for a mill, the capital expenditure on furnaces, even with separate boiler settings, should compare favorably with the cost of the old grate furnaces and boilers. Moreover, they will offer the advantages of saving in fuel, in wear and tear, and in metal to such an extent as to form a fair profit in the present hard times experienced by iron and steel manufacturers.

Mr. Frederick Siemens has suggested this application for iron and steel-works of large regenerative gas-furnaces heated by radiation from flame. Manufacturers who think that the suggestion that has been made is in advance of the times, and who might doubt the possibility of obtaining a flame of such a considerable length as would be required for a furnace to heat 100 or 200 tons of metal per day, will be pleased to learn that the problem has been already solved by Mr. Siemens in connection with the manufacture of glass. We have many furnaces of the dimensions now foreshadowed for heating iron and steel, some of which have a run of flame upward of 40 feet long, and one of them measuring 42 feet by 16 feet 6 inches, inside dimensions, holds 130 tons of metal, and it is of such considerable productive capacity as to require a bed of 12 gas-producers.

GLASS-FURNACES.

On the present occasion, it is not necessary to refer to the details of the glass-furnaces constructed respectively on the old and new principle, which Mr. Frederick Siemens has tested at Dresden, but it may be well to state that the advantages of the new system are quite maintained. Thus, fewer pot breakages occur. The loss by waste glass continues to diminish, and fewer repairs are required. Moreover, a superior quality of glass is produced from a cheaper composition than hitherto employed. The gross results are, that the new furnaces last six times as long, and melt more than nine times the quantity of material that they did previously to their reconstruction. The flame being kept away from the working-holes, the glass-blowers work more at their ease, turn out a better product, and are able to reheat their glass in the furnace without tarnishing it.

With these advantages, and others of a minor character, a glass-blower is able to produce 50 per cent more goods without much greater exertion. In another furnace, in which lamp glass chimneys are made, a more refractory material is employed than hitherto, and the glass produced is whiter and of better quality, while open instead of closed pots can be used for the production of superior qualities of glass, whereby a great saving in pots and fuel is effected.

BOILER HEATING.

Another most important application of this new system, for the greater extension and improvement of which trials are now making, is to the heating of boilers by means of gas. To obtain the greatest benefit from this method of firing, it is necessary that the boiler should be worked day and night; for if only worked in the daytime, the saving effected by the use of gaseous fuel is not so great as when worked continuously. If flame is allowed to touch the sides of a boiler, there is of necessity smoke produced on its inside surfaces, and the radiant heat of the flame not being able to penetrate such an atmosphere of smoke, the water in the boiler can not get the advantage of it. It will readily be perceived how great a quenching effect the metal of the boiler has upon a flame, when it is remembered that the temperature of steam, even at 60 pounds pressure, which is of course that of the boiler, is only 311 degrees Fahr., while that of the gaseous flame in contact with it is about 3000 degrees Fahr. In this application, the principle has been followed of allowing the active flame to have free space for its development and for the radiation of its heat within the length of the tube, and not allowing it to touch the sides until after complete combustion has been effected, when the products of combustion may be brought into direct contact with solid bodies. By this arrangement, perfect combustion is produced, and there is no smoke. But, besides this, a boiler fired in this manner lasts longer, as the plates are worn away more readily through direct contact with the flame than from any other cause. As the heat of the products of combustion comes into direct contact with the sides or flues of the boiler and its regenerators, it is completely utilized, and the maximum of heating effect is thus insured.

The results obtained in actual practice prove that almost all heating apparatus used in the arts in which there is no chemical necessity for

direct contact of flame with the substances treated will be materially improved by the new method of heating that is recommended in this paper.

THE THEORY OF COMBUSTION.

Mr. Frederick Siemens, in his remarks during the discussion of his paper at Chester, said: "There have been various theories of combustion proposed, but it was agreed in all of them that the flame or the gases in combustion forming the flame were violently excited, and that the molecules of gas were rotating around one another, or were in motion of some kind. He thought the electrical theory had the best chance of being the right one, and would adopt it, because it easily explained all the occurrences. According to this theory, flame consisted of explosions of lightning, very numerous, but very minute, and it was quite natural to expect that nobody exposed to it could withstand its action for any length of time, and hence it was that bodies were soon destroyed when exposed to the cutting action of the flame." From this explanation, it will be seen that it is the physical or chemical action of combustion that destroys the bricks with which the flame is brought into contact, so that their protection by cooling action from the outside, as was suggested, means interference with combustion, and that to such an extent as to involve considerable waste of fuel and the production of much smoke.

Mr. Frederick Siemens had frequently observed with regard to regenerative furnaces, that a short combustion-chamber invariably gave unsatisfactory results, and accounts for it by the circumstance that the flame is hardly formed before it has to pass through the outer ports and into the brick-work of the regenerators, whereby combustion is checked, and smoke is formed. To work well, a brick or pottery kiln should be so built that combustion can take place in a free space before being brought into contact with the bricks or pottery. Zinc distilling-furnaces, and in fact all furnaces in which muffles, tubes, crucibles, and other vessels are used, will, in the same way, be much more economically worked on this new principle.

In conclusion, it may be stated that the regenerative gas-furnace will, when the principle of the exclusive application of the radiant heat of the flame to the heating-chamber is made in a thorough and efficient manner, give results that will far surpass any that have been obtained from it hitherto, and that its application in the arts will be multiplied to a degree that even its warmest admirers would scarcely have thought possible a short time ago.

BOOKS RECEIVED.

A Treatise on Explosive Compounds, Machine Rock Drills, and Blasting. By Henry S. Drinker, E.M., Author of a Treatise on Tunneling, etc. New York: John Wiley & Sons. 1883. Quarto, pages vi+406 (including Index), 133 Illustrations, and 4 folding Plates. $5.

The Strains on Framed Structures, with Numerous Practical Applications to Cranes, Bridge, Roof, and Suspension Trusses, Braced Arches, Pivot and Draw Spans, Continuous Girders, etc. Also, Determination of Dimensions and Designing of Details, Specifications, and Contracts, Complete Designs and Working Drawings. By A. Jay Du Bois, C.E., Ph.D. Author of Elements of Graphical Statics, etc. New York: John Wiley & Sons. 1883. Quarto, Pages xix+390 (including Index), hundreds of cuts, and 21 full-page and 7 folding Plates. $10.

Report of the Smoke Abatement Committee, 1882, with Reports of the Jurors of the Exhibition at South Kensington, and Reports of the Testing Engineer, to which are added the Official Reports on the Manchester Exhibition, and 76 Plates of Illustrations, and 34 Tables of Results of Tests of Heating and Cooking-Grates and Stoves, Steam-Boiler Appliances, Fuels, etc. London: Smith, Elder & Co. 1883. Quarto, pages xiv+192 (including Index).

(United States Geological Survey. J. W. Powell, Director.) *Tertiary History of the Grand Cañon District.* With Atlas. By Clarence E. Dutton, Captain of Ordnance, U.S.A. Washington: Government Printing-Office. 1882. Quarto, pages xiv+264 (including Index), and 42 Plates. [Vol. II. Monographs of the United States Geological Survey. Department of the Interior.]

Atlas to Accompany the Monograph on the Tertiary History of the Grand Cañon District. By Capt. Clarence E. Dutton, U.S.A. Washington. 1882. Twenty-three Atlas Sheets, about 20 by 33. Lithographed by Julius Bien.

[Treasury Department.] *Annual Report and Statements of the Chief of the Bureau of Statistics* on the Commerce and Navigation of the United States for the Fiscal Year ended June 30, 1884. Foreign Commerce. Washington. 1884. 8vo, pages cxv+1045. (*No Index.*)

Bulletin of the United States Fish Commission. Vol. IV., for 1884. Washington. 1884. 8vo, pages ix+488 (including Index).

The Elasticity and Resistance of the Materials of Engineering. By William H. Burr, C.E., William Howard Hart Professor of Rational and Technical Mechanics at Rensselaer Polytechnic Institute. New York: John Wiley & Sons. 1883. 8vo, pages xv+753 (including Index). $5.

Water Supply Considered Mainly from a Chemical and Sanitary Stand-Point. By William Ripley Nichols, Professor at the Massachusetts Institute of Technology. New York: John Wiley & Sons. 1883. 8vo, pages vi+232 (including Index and Bibliography).

Geological Survey of Alabama. Report for the Years 1881 and 1882, embracing an Account of the Agricultural Features of the State. By Eugene Allen Smith, Ph.D., State Geologist. Montgomery, Ala. 1883. 8vo, pages xvi+615 (including Index) and eight Maps.

Galvanic Action between the Metallic Bases of Earths and Metals.—Mr. J. Johnstone, of Edinburgh, in the *Engineer*, mentions the galvanic action set up by natural process between the metallic bases of earths and metals. He says that his attention was first drawn to the subject upward of forty years ago, when he saw an iron water main lifted out of a street in Greenock, where it had lain in a small bed of sand crossing the line of the street. At this part, the outside of the pipe was covered with nodules, which were conglomerates of sand and oxide of iron. Inside the pipe, opposite to each of the exterior nodules, was a corresponding nodule of oxide of iron. These interior nodules were shaped like those found in the cavities of hematite. It was therefore assumed by Mr. Johnstone that the inner nodules were formed as a result of galvanic action, which was transmitted through the body of the metal of the pipe from the nodules of sand and oxide on its exterior. Mr. Johnstone has never seen sand similarly adhering to lead pipes unless there was also lime in the sand. He considers that galvanic action fully explains the pitting that takes place in iron pipes that have lain long in sand, and which are thereby eventually destroyed. This suggestion may explain some phenomena of ore-deposits.

THE WORLD'S MARKET STATISTICS OF COPPER.

By A. Harnickell, New York.

FINE COPPER IN TONS OF 2240 POUNDS.

1880.	1881.	Grand total of actual copper commercially handled in 1884, 179,150 tons.	1882.	1883.	1884.	1885. January.
The market for the sale and purchase of copper for the world, except for the United States is in						
England and France; Germany and Russia produce a part of their consumption, but receive some also from the United States and from England.						
The imports into England and France, from the United States, were			2,000	14,000	25,000	4,400
The imports into England and France, from Chili, Australia, etc			91,400	96,300	92,500	8,000
Germany, etc., imported from the United States			600	4,600	6,300	
Germany, etc, imported from Chili			.....	.....	850	
English production from pyrites and mines			15,700	15,000	14,000	
		Total supply, as far as it reaches commerce	109,700	129,900	138,650	
Exports from and consumption in England and France, adding also the direct German importations, were:						
102,000	112,000	Used copper tons,	113,600	125,100	143,850	
		and the deliveries in France and England were for January	4,900	5,8000	8,300	9,200
The stock in England and France at the end of the year was			35,000	.....	37,700	

IN THE WESTERN HEMISPHERE.

1876.	1880.	All countries except the United States depend on London, and their exports are counted in above imports.				
51,000	43,000	Chili shipped in	43,000	41,000	44,000	My estimate of expectancy, 1885.

IN THE UNITED STATES.

The production was:	Counted in	Pounds.	Pounds.	Pounds.	
Lake Superior mines		57,000,000	59,000,000	68,500,000	*67,000,000
Montana	"	9,000,000	24,500,000	37,000,000	†35,000,000
Arizona	"	17,000,000	22,500,000	23,000,000	25,000,000
Colorado, California, and all others.		5,000,000	7,000,000	7,300,000	5,000,000
		88,000,000	113,000,000	135,800,000	
Surplus stock on hand January 1st, 1884		.....	.....	23,000,000	
				158,800,000	132,000,000
Home consumption was		77,000,000	80,000,000	70,000,000	76,000,000
		11,000,000	33,000,000	80,800,000	56,000,000
Export of United States copper		4,850,000	39,800,000	77,000,000	
Stock on hand January 1st, 1885.		.....	.....	11,800,000	Surplus of 1885.
There were also pyrites, etc., imported and re-exported as copper		1,000,000	2,000,000	3,000,000	
The consumption of copper in the United States had increased enormously before 1882, and has not increased since, but will naturally increase again.					
The consumption of Europe and the East has increased in three years by 27 per cent. or by					30,250 Tons.
And in five years by 41 per cent.					
The surplus exported from the United States in 1884, was:					
Arrived in Europe in 1884				31,300 tons.	
" " January, 1885				4,400 "	
Total United States exports		77,000,000 pounds.			34,380 tons.
In 1885, Europe may get only					25,000 tons.
that is, with Chili Bars at about £50; less, if £47 or £45.					

* Owners of surviving mines pretend this figure, 75,000,000.
† Owners of surviving mines pretend this figure, 55,000,000; another, 40,000,000.
These estimates would not come true if Chili Bars went to £53.

CHESAPEAKE & OHIO RAILROAD COMPANY.

Mr. J. W. Hopkins, Fuel Agent of the Chesapeake & Ohio Railroad Company, sends us the following report of the total output and distribution of coal and coke received from the mines on the line of the railroad (including mines on Lexington Division) for the month ended January 31st, 1885, in tons of 2000 pounds:

Kind of coal:	—For January.— 1885.	1884.	Increase.
Cannel	826	113	713
Gas	38,523	26,582	11,941
Splint and Block	18,302	6,518	11,784
New River, etc	43,260	40,625	2,635
Coke	12,869	5,702	7,167
Totals	113,780	79,540	34,240

Distribution of above:	—For 31 days.— 1885.	1884.
Fuel for use of company	23,831	18,592
Shipped at Huntington, on Ohio River	1,234	.....
Delivered on line of Elizabethtown, Lexington & Big Sandy Railroad.	18,635	3,078
Delivered on line of Chesapeake & Ohio Railroad, excepting Richmond	15,446	14,188
Delivered at Clifton Forge to Richmond & Alleghany Railroad	4,455	886
Delivered at Staunton to Baltimore & Ohio Railroad	.....	.....
Delivered at Waynesboro' to Shenandoah Valley Railroad	88	17
Delivered at Charlottesville to Virginia Midland Railroad	2,149	6,899
Delivered at Richmond, Fredericksburg & Potomac Junction to Richmond, Fredericksburg & Potomac Railroad	774	371
Delivered at Richmond for consumption, including tugs, dredges, etc.	9,913	10,893
Shipped at James River wharves	3,674	.....
Delivered at Newport News for consumption, including tugs, dredges, etc	467	915
Shipped at Newport News wharves	33,114	23,701
Totals	113,780	79,540

CHARCOAL BURNING IN KILNS AT BOXHOLM, SWEDEN.*

By W. Sandahl.

At Boxholm, in Sweden, kilns have been introduced for the purpose of carbonizing saw-mill waste for iron-works. They are rectangular chambers, 30 feet long, 20 feet broad at the bottom, 18½ feet at the spring of the semi-circular roof, and 19 feet high to the top of the latter. The side walls, 11½ feet high, are made with a slight inward fall. The floor is flat, except at the end walls, where it is laid with a small slope toward a cast-iron pipe, giving issue to the gases and condensable products. The former escape by an upright pipe made of sheet brass, while the latter are collected in a wooden cistern, forming a tar well. A rectangular fire-place, lined with fire-brick, extends under the center of the floor for about half its breadth, where it is connected with five narrow flues, branching out to the four corners and the center of the opposite long side, through which air is admitted to the chamber. The necks of these flues are covered by iron pipes, with low conical cowls projecting about 9 inches above the floor level. The arch is protected against rain by a light wooden roof. The saw-mill waste ribs and slabs are brought to the kilns by railroad, and stacked to dry in the air until wanted. The charging is effected through doors, of which there are two, at each end of the kiln. One of these, at the floor-level, is 5 feet by 4 feet, while the other, at the level of the arch springing, is only 4½ by 2½ feet. A bed of logs or large ribs is laid across the kiln to a depth of about 9 inches, in order to facilitate the firing of the wood, and upon this the remainder of the charge is laid, with the length of the wood in line with the longer sides of the kilns. Experiments made with alternate layers, laid crosswise, gave no better results, while the charging was somewhat more expensive.

When the whole quantity of wood, about 10,000 cubic feet, has been charged, which can be done by ten men in three or four days, the lower doors are closed and bolted, and fire is applied through the central flues. The upper doors are left open until the third day, to give free vent for the steam given off from the damp wood. This is succeeded by gas, at first white, and then becoming darker, and more abundant until the middle of the sixth day of burning, when it mostly changes to blue. The burning is controlled by the character of the gas; if the fire takes too strong a hold, the flues are damped or plugged with wood to check it. To provide for the relief of internal gas pressure upon the structure in the latter case, the side walls are perforated with three small tubes about 18 inches above the floor, which are kept constantly open. According to the degree of dryness of the wood, the burning lasts from ten to eighteen days; the cooling takes sixteen days; and the discharging is effected in one and a half days by two men. When the boiler is emptied, any repairs that may be required are made, when the next charge is immediately introduced. The coaling is done by piece-work. The total cost for labor is about 1s. 4d. per last (76 cubic feet) of charcoal produced. The annual production of each kiln is 800 lasts of coal and 160 gallons of tar. The loss in carbonizing varies with the dryness of the wood, but may be taken as averaging 1000 feet upon the total contents of 10,000 feet, the volume of the coal obtained being from 85 to 90 lasts, or from 6460 to 6840 cubic feet, representing a yield of from 58 to 62 per cent in volume of the wood used. When the ground occupied by the kilns was used as an open coaling place, from two to three piles of 75 lasts could be burnt annually, with a cost for labor of 2s. 5d. per last, with a yield of 50 per cent upon the volume of the wood burnt. The coal produced from sawed stuff is less adapted for blast furnaces than for Lancashire forge fires, for which it is well suited when mixed with a proportion of charcoal from natural wood. As compared with open heaps, kilns have the following advantages:

1. Lower working cost.
2. Better yield, the charcoal being cleaner and freer from dust.
3. The carbonization is more easily conducted, not being dependent upon the weather, and also requiring less skilled labor.

Excavation and Embankment by Water-Power.—Before the American Society of Civil Engineers, a paper by E. B. Dorsey, M. Am. Soc. C.E., was read on Excavation and Embankment by Water-Power. This referred to the use of water for excavation in the hydraulic mines in California, and to the fact that the material carried by the water has frequently formed in the river to which it was conducted very solid dams. The unit of measurement of water in California is the miner's inch, which varies in different localities, but that generally adopted equals 17,000 gallons in 24 hours. The quantity of earth that a miner's inch will remove of course varies greatly, but experiments carefully made by Hamilton Smith, Jr., showed an average of 4·48 cubic yards of gravel removed by one inch of water. In constructing dams by this process, an engineer can pick out the softer portions of excavations and leave the hard, and thus transport more material. The plan proposed to construct the dam referred to in this paper was to pump the water to an average hight of 200 feet, and to carry the water and material to the embankment in a flume 2½ feet square. Near the discharging end, the upper portion of the side of the flume would be cut away, so that the water containing the lighter and finer material would overflow first, and thus could be used at the center of the embankment to form a fine puddling material, the coarser portion being used in the exterior. Statistics collected by Mr. A. J. Bowie show the cost by cubic yard for the removal of material at various California mines by the hydraulic process was from $0·0207 to $0·063, and, exclusive of the cost of water, from $0·0130 to $0·049 per cubic yard. It is estimated that a dam could be built where the water would have to be pumped 200 feet high that would cost as follows: the cost varying with the size of the dam and consequently the duration of the work. This estimate includes all machinery required:

Duration of work,	1	year,	cost per cubic yard	$0·145
"	2	years,	"	0·115
"	3	"	"	0·105
"	4	"	"	0·100
"	5	"	"	0·097
"	6	"	"	0·095

* From the *Jernkontorets Annaler*, published in the Proceedings of the Institution of Civil Engineers of London.

MORTILLET'S CONCLUSIONS REGARDING EARLY MAN IN EUROPE.

Science gives the following summary:

1. During the Tertiary age, there existed a being intelligent enough to produce fire and to fabricate stone implements.
2. This being was not yet man: it was his precursor, an ancestral form, to which I have given the name of the *man-ape*.
3. Man appeared in Europe at the beginning of the Quaternary period, at least 230,000 or 240,000 years ago.
4. Our first human type was that of Neanderthal. This type, essentially autochthonous, was slowly modified and developed during the Quaternary period, resulting in the type of Cro-Magnon.
5. His industry, very rudimentary at first, developed progressively in a regular manner, without shocks. This proves that the progressive movement went on upon the spot, without the intervention of propagandism and invasion from abroad. It was therefore really an autochthonous industry.
6. The regular development of this industry has enabled me to divide the Quaternary period into four epochs: First, the *chellean*, anterior to the glacial period: second, the *mousterian*, contemporaneous with it; third and fourth, the *solutrian* and the *magdalenian*, posterior to it.
7. Quaternary man, mainly a fisherman, and especially a hunter, was acquainted neither with agriculture nor with the domestication of animals.
8. He lived in peace, entirely destitute of religious ideas.
9. Toward the end of the Quaternary period, in the *solutrian* and the *magdalenian* epochs, he became an artist.
10. With the present condition of things, there have come invasions from the East that have profoundly modified the population of Western Europe. These have brought thither ethnic elements entirely new, and in great part brachycephalic. To the simplicity and the purity of the autochthonous dolichocephalic race, there have succeeded numerous crosses and mixtures.
11. The industry is found to be profoundly modified. Religious ideas, the domestication of animals, and agriculture have made their appearance in Western Europe.
12. This first invasion, which took place at the Robenhausen epoch, set out from the regions of Asia Minor, Armenia, and the Caucasus.

A Deep Artesian Well.—Charleston, S. C., is about to undertake the driving of the deepest artesian well in the world. It will be driven in the main part of the city, and, as it is expected to furnish 4,000,000 gallons of water a day, it is calculated, with two similar wells already down, to furnish a sufficient supply of water for the entire city for many years. The new well will be 2000 feet deep, will be at least six inches in diameter at the bottom, and is to be completed by next August.

A New Primary Cell.—Dr. Pabst, of Stettin, has invented a primary cell of very low internal resistance and of remarkable constancy. It has electrodes of carbon and wrought-iron dipping into a solution of ferric chloride. It is practically unpolarizable and self-regenerating. It works at the expense of iron and of the oxygen of the air, which is absorbed into the liquid, ferric oxide being deposited at the bottom of the cell. Professors Bartoli and Papasogli's new cell, which has also been favorably received, has electrodes of platinum and of a brick of thoroughly incorporated retort coke and Ceylonese graphite, which dip into hypochlorite of soda. It uses up the carbon element. It has not half the electro-motive force of Pabst's device.

Legislation against Explosives.—In the New Jersey House at Trenton, a bill has been introduced prohibiting the manufacture, sale, or bringing into the State of any metalline, nitroleum, Neptune powder, Oriental powder, Hercules powder, thunderbolt dynamite, or other nitro explosive compound unless permission is first obtained from a judge of the circuit court of the county in which manufacture, etc., is desired; a certificate must first be filed with the county clerk giving in detail the full name and residence of the corporation or persons proposing to manufacture, etc., the place of manufacture and the amount to be manufactured, etc. The manufacturer must keep book accounts of all the explosives manufactured and the sheriff shall see them twice a year. The penalty is fixed at one year's imprisonment or a fine of $250. An appeal may be made to the chancellor in case the circuit judge refuses a permit.

Russian Expedition for Sulphur Deposits.—The Russian government is preparing an expedition to Western Siberia for the purpose of examining some sulphur deposits recently discovered there. The natives have for many years had knowledge of these deposits, but the government has only recently been made cognizant of them through a report by Lieutenant Kalityn. According to the statement of M. Konschin, a mining engineer, one of the deposits contains upward of five million poods of sulphur, the number of the deposits being ten. Europe has hitherto been supplied with this article from Sicily, and it is hoped that the Russian deposits may compete with the mines in that island. In Russia, sulphur has hitherto only been found at Tchirkota, not far from Petroffsk, in Daghestan, which has chiefly been delivered to the powder-mills. The expedition in question will leave St. Petersburg this month.

A Tunnel under the East River.—Articles of association incorporating a company to build a tunnel under the East River at Blackwell's Island have been filed at Albany. The corporate name of the company is the East River Tunnel Railroad Company. The amount of the capital stock is $20,000,000. The tunnel is to begin in Ravenswood, Long Island City, go under Blackwell's Island to this city on the line of First avenue, between Thirty-fourth and Eighty-sixth streets. The entire line of the tunnel will be through solid gneiss rock. It is intended to have two openings, one on each side of Blackwell's Island, for shafts from which to run the tunnel, as well as for light and ventilation. The distance from shore to shore will be 2110 feet. The approaches from each end will be about 700 feet, making the total length of the tunnel 3510 feet, or a little more than two thirds of a mile. The tunnel, it is asserted, can be built for one fifth the cost of a bridge, and will be no obstruction to navigation. Among the incorporators are Col. Robert Townsend, L. Bradford Prince, ex-Senator Birdsall, James H. Platt, David B. Sickles, Edward Holland, William H. Bellamy, William A. Lawrence, and E. Platt Stratton.

ELECTRIC TRANSMISSION OF POWER IN BOSTON.

The Massachusetts Electric Power Company started recently in Boston an installation which, according to a correspondent of the *Electrical World*, is the largest plant in the country where the electric transmission of power is the sole object. It is undoubtedly one of the most advanced steps taken in electrical applications. The company was organized last spring by several prominent business men of Boston, on a business basis and for business purposes. It bought exclusive use of the "Daft system" of electric lighting and transmission of power from the Daft Electric Light Company, New York, for the State of Massachusetts.

In May, a 6 horse-power generator was placed at 12 Federal street, Boston, and connections were made with a 3 horse-power receiver at the printing-house of J. S. Adams, 299 Washington street, and the stamp-works of Dimond & Co., 22 Milk street. A month later, the former moving, the receiver was changed to the printing-house of Newman & Mansfield, 43 Kilby street. These establishments have been in continual successful operation.

The Massachusetts Company, within a few months, absolutely satisfied in regard to the practicability of the system, and clearly seeing the immense possibilities and value of the same, at once ordered the largest dynamo the Daft Company then manufactured, with its proper complement of receivers. While the order was filling, active work was begun upon the construction of a main line. After a great deal of hard work, tact, and determined effort, a line of "00" wire was built from 197 Congress street, where the company obtained its power, over house-tops to Cornhill, a distance of about three quarters of a mile. From this main line, the proper taps were taken with No. 4 wire to the various subscribers. The difficulty of stringing such a wire can only be appreciated by those who have had some experience in such matters, especially as the wires run over some of the highest buildings in the city.

It might be here mentioned that the construction was intrusted to Mr. P. A. Dowd, an electrical constructing engineer of high repute and long experience, a gentleman who has done a great deal of constructing for many telegraph, telephone, electric light companies, and for the police and fire departments.

The Daft Company shipped the large dynamo and its receivers a few months ago, but every thing was not ready till the latter part of December. This machine is differentially wound, permitting of a wide range of current strength, to be automatically varied, according to external requirements, and of very low internal resistance.

The normal speed of armature is 768 revolutions, its maximum electromotive force is 123 volts, and its working strength of current 300 ampères The total weight of the dynamo is 4200 pounds, the armature weighing 450 pounds.

Obviously the number of receivers run depends upon their aggregate power. Nine have been shipped for this 50 horse-power dynamo, varying from ½ horse-power to 10 horse-power. They are operated in multiple. On December 25th, the old 6 horse-power dynamo was stopped, and its subscribers were connected with the new mains, with three new subscribers. One of these was W. H. Chandler, printer, 21 Cornhill, using a 6 horse-power receiver. From this establishment, a countershaft runs into an adjacent building, from which two other parties get power—a trunk and bag manufacturer and a machine-shop. P. A. Swasey, a blackboard manufacturer, 35 Pemberton square, uses a 4 horse-power receiver, and the Boston Safe Deposit and Trust Company, 87 Milk street, uses a 2 horse-power motor for ventilating the vaults. This fan deserves especial notice. The armature shaft and fan shaft are *one*, thus doing away with all countershafting, belting, etc. A hand regulating switch is placed upon the wall within easy reach. By this means, the room can be ventilated as desired, with speeds varying from nothing to 500. The neatness and simplicity of this arrangement make it perfection.

These five places have thus been operated since December 25th, 1884, to the satisfaction of all the subscribers. They are all dependent upon the system, and are pleased with the beauty of it in comparison with the individual troubles of operating by steam, gas, compressed air, caloric, or any other type or form of energy. Other receivers will be rapidly added. The subscribers, of course, are absolutely independent in regard to each other, using the power when and as long as they please.

The Biggest Gun Yet.—Preparations are making at Woolwich Arsenal for the proof trials of an enormous gun that is now in process of construction at Elswick, and will be delivered a few months hence. It will weigh 110 tons, and have a carriage of 90 tons, the total weight of 200 tons being considerably in excess of previous undertakings. The gun will be a breech-loader and have a bore of 16 inches. Its length will be 43 feet 8 inches; but its extreme diameter at the breech will be only 5 feet 6 inches, and it will have a very elongated chase or barrel tapering down to 28 inches, with a slight swelling at the muzzle.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED JANUARY 6TH, 1885.

310,164. Furnace for the Manufacture of Iron directly from the Ore Charles Adams, Alleghany City, Pa.
310,172. Amalgamator. John C. Blevney, Newark, N. J.
310,178. Wire-Barbing Machine. Frank W. Brainerd, Chicago, Ill.
310,181. Middlings-Purifier. John M. Case, Columbus, Ohio, Assignor to the Case Manufacturing Company, same place.
310,187. Apparatus for Refining Silver. Ferdinand Dickert, Salt Lake City, Utah.
310,194. Grate-Bar Attachment for Furnaces. Michael A. Foster, St. Louis, Mo.
310,215. Furnace-Grate. Frederick V. Medynski, Des Moines, Iowa.
310,251. Pneumatic Separator. Delos Car-Skaden, Chicago, Ill.
310,252. Apparatus for Measuring Electricity. Jules Cauderay, Lausanne, Switzerland.
310,278. Coal-Chute. Jacob Heatherington, Bellaire, Ohio.
310,286. Metal-Bending Machine. Oliver C. Knipe, Morristown, Pa.
310,296. Mortar-Bed for Stamp-Batteries. George Massu and Filomeno Fernandez, Mazatlan, Mexico.
310,302. Process for the Separation of Metals. Bernard Moebius, Chihuahua, Mexico.
310,347. Pressure Regulator. George Westinghouse, Jr., Pittsburg, Pa.
310,348. Pressure Regulator and Relief-Valve. George Westinghouse, Jr., Pittsburg, Pa.
310,354. Method of Making Sheet-Iron. W. Deewes Wood, Pittsburg, Pa.
310,363. Steam-Engine Governor. George W. Bigelow, New Haven, Conn.
310,369. Steam or Vapor Engine. Albert Bown, Streator, Ill., Assignor of one half to Fawcett Plumb, same place.
310,374. Roller Mill. Samuel R. Campbell, Buffalo, N. Y.
310,376. Apparatus for the Manufacture of Prussiate of Potash. Elles R. Carhuff, Newark, N. J.
310,394. Device for Making Barbed Strips for Fences. Josiah W. Ells, Pittsburg, Pa.
310,402. Apparatus for Annealing Wire and Metal in Other Forms. Samuel Fox, 110 Gloucester Place, County of Middlesex, England.
310,430. Roller-Mill. Noah W. Holt, Buffalo, N. Y.
310,433. Process of Hardening Steel. Napoleon C. Hubbell, Hartford, Conn., Assignor to Louis C. Heublein, same place.
310,454. Metallurgical Furnace. William McKenna, Pittsburg, Pa., Assignor of one half to D. E. Park, same place.
310,487. Apparatus for the Manufacture of Gas. Augustus L. Allen, Poughkeepsie, New York.
310,497. Process of and Apparatus for the Fractional Distillation of Petroleum. Richard Dean, Cleveland, Ohio, Assignor to Joseph B. Meriam, same place
310,500. Process of Constructing Lead Vessels. Hermann Egells, Berlin, Germany.
310,526. Method of Coiling Metal Rods. Robert W. Kennedy, Pittsburg, Pa., Assignor to Jones & Laughlins (Limited), same place.
310,531. Rotary Engine. Charles H. Melville and Thomas W. Brown, Chattanooga, Tenn.
310,533. Apparatus for the Electrolytical Separation and Deposition of Metals. Bernard Moebius, Chihuahua, Mexico, Assignor of three eighths to William E. Pope, Athens, Ga

GRANTED JANUARY 13TH.

310,582. Furnace. George Gulickson, Chicago, Ill.
310,616. Cooling Attachment for Gas and other Machines. John Ring, St. Louis, Mo.
310,619. Ore-Furnace. Eli F. Russell, San Francisco, Cal.
310,633 Valve for Rock-Drills George R. Cullingworth, New York City.
310,656. Rock-Crusher. Aaron G. Dyer and James M. Dyer, San Francisco, Cal.
310,664. Apparatus for the Distribution of Electricity. Oscar Gassett, Boston, Mass.
310,665. Apparatus for the Distribution of Electricity. Oscar Gassett, Boston, Mass.
310,667. Hoisting Apparatus. Duncan Gilchrist, Ishpeming, Mich., Assignor of one half to the Marinette Iron-Works Company, Marinette, Wis.
310,680. Nut-Forging Machine. Frederick A Hasenclever, Düsseldorf, Germany, Assignor to the Patent Nut and Bolt Company (Limited), London Works, England.
310,681. Mechanism for Operating Fan-Blowers. John G. Hoffman, New York City, and George Weber, Brooklyn, Assignor to the J. G. Hoffman Manufacturing Company, Brooklyn, N. Y.
310,695. Crane for Crucible-Furnaces. Lewis W. Mallasee and Frank B. Mimick, Pittsburg, Pa.
310,711. Pile for Sheet-Iron. David B. Oliver, Pittsburg, Pa.
310,727. Protector for Underground Pipes. William Rowbottom and John M. Rowbottom, Alleghany City, Pa.
310,745. Gas-Furnace. William Swindell, Alleghany City, Pa.
310,759. Lime-Kiln. Abner B. Weeks, Rockland, Me., Assignor of one half to Francis Cobb, same place.
310,774. Reversing-Gear for Shaping Machines. David L. Ballard, Torrington, Conn., Assignor to the Hendey Machine Company, same place.
310,805. Machine for Making Compound Wire. Josiah W. Ells, Pittsburg, Pa.
310,813. Process of Making Barbed Fences. Franklin D. Ford, Providence, R. I., Assignor of one half to Cornelius S. Sweetland, same place.
310,824. Sheet-Metal-Roofing Machine. John L. Holton, New Lisbon, Ohio.
310,835. Furnace-Front. William Lowe, Bridgeport, Conn.
310,841. Means for Preventing Leakage from Gas-Conducting Mains. Henry Moeser, Alleghany, Pa.

REISSUE.

10,549. Apparatus for Amalgamating Ores. Martin P. Boss, Oakland, Cal.

GRANTED JANUARY 20TH.

310,875. Well-Drilling Machine. William E Brown, Elbridge, N. Y.
310,893. Feeding-Table for Rolling-Mills. Robert W. Hunt, Troy, N. Y.
310,901. Process of Making Malleable Ferro-Nickel and Ferro-Cobalt. Henry Marbeau, Aîné, Paris, France.
310,902 Furnace for Heating Disks. Alexander McDonald, Cambridge, Mass., Assignor to the McDonald Stone Cutting Machine Company, Nassau, N. H.
310,920. Smoke-Consumer for Locomotives, Stationary Boilers, Furnaces, and Stoves. Henry A Spear, Charlestown, and Albion P. Wright, Jr., North Adams, Mass., Assignors to themselves, Harrie C. Brownell, Newtonville and Frank Brownell, Newton, Mass
310,956. Art of Making Wire. Thomas Midgley, Worcester, Mass., Assignor of one half to Charles G. Washburn, same place.
310,987. Drill Chuck. James S. Church, Milwaukee, Wis., Assignor of one half to George M. Hinkley, same place.
310,994. Apparatus for Coating Wire Work Metal. Moses G. Farmer, Newport, R. I.
311,017. Tuyere-Iron. Benjamin S. Logan, Lebanon, Pa
311,032. Quartz-Mill. Albert E. Redstone San Francisco, Cal.
311,047. Dumping-Car. Clemson L. Van Wormer, Melrose, Mass.
311,052. Device for Conveying Clay and Clay-Shale to the Machines for Pressing them into Bricks. James D. Anderson, Highland Park, Ill.
311,058. Ore-Roasting Furnace. John F. Carter, Philadelphia, Pa., Assignor to William McGeorge, Jr., same place.
311,081. Clay-Crushing Machine. Truman D. McKinney and Walter A. Soper, Tecumseh, Mich.
311,082. Stone-Drilling Machine. Louis McMurray, Baltimore, Md.
311,106. Air-Compressing Engine. Francis E. Corey, Westborough, Mass.
311,124. Process of and Apparatus for Manufacturing Gas. John Hanlon, New York City.
311,125. Process of and Apparatus for Manufacturing Gas. John Hanlon, New York City.
311,135. Recovering Rubber from Rubber Waste. Charles J. McDermott, Sandy Hook, Conn., Assignor to New York Belting and Packing Company, New York City.
311,156. Manufacture of Artificial Stone Compositions. C. Irvine Walker, Charleston, S. C., Assignor to the Stoney Landing Company, same place.
311,157. Rope Drill-Jar. Lambert Wheeler, Allentown, N. Y., Assignor to Lizzie Wheeler, same place.
311,159. Method of Removing Silicon from Wrought-Iron. W. A. Otto Wuth, Pittsburg, Pa.
311,161. Gas-Generator. Frederick Clauss, Elizabeth, N. J.

GRANTED JANUARY 27TH.

311,171. Thread-Protector for Wrought-Iron Pipe. Mildred Blakey, Alleghany, Pa.
311,190. Hot-Blast Stove. David Lamond, Alleghany, Pa.
311,229. Feeding Device for Rolling-Mills. Wilson B. Chisholm, John Walker, and Edward H. Martin, Cleveland, Ohio.
311,231. Ore Concentrator and Separator. Frederick G. Corning, Brooklyn, Assignor of one half to George H. Benjamin, New York City.
311,235. Rock Crusher and Pulverizer. Aaron G. Dyer and James M. Dyer, San Francisco, Cal.
311,250. Rolling-Mill for Tramway Rails. Heinrich Koehler, Bochum, Prussia, Germany, Assignor to Die Gesellschaft für Stahlindustrie, same place.
311,251. Hoisting-Machine. Edward S McKinlay and William A. McKinlay, South Pueblo, Colo
311,258. Amalgamator. David S. Randolph, St. Louis, Mo., Assignor of one half to John A. Cabie, same place.
311,263. Machine for Slitting Metal. John N Short, Johnstown, Pa., Assignor to the Cambria Iron Company, same place.
311,274. Dumping-Car. Matthew Van Wormer, Malden, Mass.
311,287. Plastic-Cement Mixture for Non-Conducting Covering for Boilers, etc. D. Austin Brown, Boston, Mass.
311,294 Process of Surface-Coating Iron. Pontus H. Conradson, Brooklyn, N. Y., Assignor of one half to Albert W. Hale, Plainfield, N. J.
311,341. Machine for Mixing and Molding Artificial Fuel and other Granulated Materials. Emile J. Loiseau, Philadelphia, Pa.
311,352. Amalgamating Apparatus. Adam Miller, London, England.
311,353. Amalgamating Apparatus. Adam Miller, London, England.
311,354. Amalgamating Apparatus. Adam Miller, London, England.
311,355. Amalgamating Apparatus. Adam Miller, London, England.
311,358. Forge. J. Lester Osgood, Buffalo, N. Y., Assignor to William F. Wendt, same place.
311,365. Discharge Apparatus for Coal and Ore-Bins. H. G Reed, Milwaukee, Wis.
311,394. Combined Anvil, Vise, and Drill. James Weathers, Indianapolis, Ind.
311,398. Chuck for Rock-Drills. Charles S. Westbrook, Sprague ville, N. Y.
311,403. Furnace for Generating Illuminating Gas. S. L. Anthony, New York City.
311,441. Gas-Generator. Ludwig Mond, Winnington Hall, near Northwick, County of Chester, England.

FURNACE, MILL, AND FACTORY.

The Hendey & Meyer Engineering Company, of Denver, Colo., reports business as very favorable. It is now building a 30-stamp gold mill for the Mammoth Gold Mining Company, near Tucson, Arizona; also, two 10-stamp mills and one 20-stamp mill for different points in Colorado. The 30-stamp mill contract is for the plant complete, 100 horse-power automatic engine, two steel boilers, crushers, feeders, pumps, tanks, and batteries complete. The company reports an increasing demand for its new automatic engine involving the use of Man's automatic cut-off valve, as illustrated in our issues of February 7th and 14th. The inquiry for mining, milling, and smelting machinery is much greater than last season, and a lively trade is anticipated for this year.

The Burleigh Rock Drill Company reports business fair, with orders ahead for drills and compressors for mining purposes. It has just shipped three car-loads of machinery, intended for mines owned by English capitalists in South America. It has also recently shipped drills for granite and slate quarries in New England, and machinery for gold and silver mines in Nevada and Montana.

The Robesonia furnace plant in Berks County, Pa., which was sold to William R. White and Mrs. Henry Borie, both of Philadelphia, was purchased for $870,000—probably the largest amount ever paid in the State for a similar property. It is said that this furnace has the exclusive right forever to take as much ore as it can use from the famous Cornwall ore hills. Hence its great value.

W. Thomson & Co., hardware merchants, Toronto, Canada, have suspended. Their liabilities are $250,000, and their assets about the same amount.

The puddling-mill of Brown, Bonnell & Co., at Youngstown, Ohio, started on full-time February 23d, for the first time in two years.

The Philadelphia & Reading Coal and Iron Company has consolidated its two foundries at Pottsville, Pa. The consolidation made possible a reduction of the force.

A committee of iron manufacturers has just returned from a Southern trip, where it has been investigating for the benefit of Northern manufacturers the iron industry of the South. Mr. Bentley, of the Ohio Iron and Steel Company, of Youngstown, Ohio, states in an interview that the chief advantage in the South is the cheap and inexhaustible ore, which is delivered to the furnaces at from ninety cents to $1.12½ a ton. Ore is two kinds, hard and soft. The former has a variable quantity of lime, which makes the furnaces hard to handle so that they will produce a uniform quality of iron. Their iron is chiefly of a low grade, not suitable for mill use. The labor is chiefly colored. The pay of a common laborer is eighty cents a day, and other labor in proportion; but the difference in wages is more than compensated for by the greater efficiency of Northern labor. A conservative estimate of the cost of a ton of iron in view of these facts is from $12.50 to $13.50. The reason so large an amount of Southern iron is finding its way to Northern markets is the co-operation of the railroads. Two trunk lines to Birmingham give rates of $3.75 to New York and Philadelphia, about the same to Chicago, and proportionate rates to other desirable shipping-points. Birmingham with its vicinity is destined to become a very important factor as an iron-producing district of the United States. The surest methods of working the ores successfully, however, are not yet fully mastered, or the best results from coking. It is but a question of time when both are accomplished. While no better ores have as yet been discovered in any quantity in Alabama, and the manufacture of steel, therefore, is impracticable, yet the demand for its class of pig-iron will necessitate the North having the same encouragements extended to it by the railroads as are now extended to Alabama, in order to enable it to hold its present high position as a manufacturing section. Greater dangers from Southern competition and still lower prices need not be immediately feared, as the question is at present largely one of transportation.

It is stated that Hussey, Howe & Co., of Pittsburg, Pa., have tested eight patent natural gas furnaces in their mill. The furnaces are pronounced all that is claimed for them. One noteworthy feature is, that they can be made regular coal-burning furnaces inside of twenty minutes.

The Westinghouse Machine Company, of Pittsburg, Pa., reports trade as opening remarkably active in 1885. Its sales for the month of January were 67 engines, aggregating 1752 horse-power. The electric light industry continues to furnish plenty of business. Besides a large number of engines for lighting private establishments, twelve Westinghouse engines have been contracted for for public stations at various points. The company is also sending a good many engines to Europe, mostly to England and Holland. Among recent orders, are a 15 horse-power automatic engine for the British Admiralty, and a 9½ by 9 engine that will drive the electric lights in the South Kensington Museum, London. This latter engine is to run at 550 revolutions per minute. E. Balbach & Sons, Assayers, at Newark, have placed two orders for 25 and 35 horse-power, respectively, making the seventh Westinghouse engine in their works within the same time.

The Pacific water-jacket smelters, made by the Pacific Iron-Works, of San Francisco, Cal., are working successfully at a number of mines in Arizona.

Arrangements are making by capitalists to purchase the works of the Abbott Iron Company, at Baltimore, Md., and run them on a large scale as a steel-works. The works have been in the market for some time past, waiting for a private purchaser. The mills have been shut down about two months. The company is solvent, but had to shut down on account of the dullness of the iron trade.

A legation from Toronto and St. Catherine's, Ontario, Can., has been in Ottawa to request that crucible steel sheets for agricultural implements be put upon the free list. The matter is to be considered.

A charter has been granted to the Alleghany Iron and Steel Company, of Alleghany, Pa., the head office of which is to be located in Pittsburg. The capital is $100,000, and the directors S. W. Vandersall, F. M. Ross, Pittsburg; S. H. Johnson, Millville; and J. C. Newmyer, Swissville.

The Ellis & Lessig Steel and Iron Company, Limited, of Pottstown, Pa., expects to begin making nails at its new works on March 15th.

The iron foundry of C. L. Olds & Co., at Fort Wayne, Ind., has shut down, owing to the dullness of trade.

Keene & Haggerty, manufacturers and wholesale dealers in tin and japanned ware, at Baltimore, Md., have made an assignment. The trustee's bond is $400,000.

Señor J. Clemente Castro, C.E., of the firm of Barazante & Castro, of Valparaiso, Chili, and the Commissioner of that country to the United States, will soon leave for home. He has spent several months in visiting the important centers of manufacturing, mining, and metallurgy, from San Francisco to New York, and his report to the government of Chili will probably prove not only interesting but valuable as a means of introducing many of our manufactures into a territory that has hitherto been almost completely monopolized by Great Britain. Recent improvements in copper smelting seem destined to revive that drooping industry and to continue to Chili the privilege of setting the price of copper to the world. Señor Castro has developed very progressive ideas, and has arranged to take a very large mining and smelting plant to South America with him. He has ordered his air-compressors and drills from the Rand Drill Company, and his hoisting machinery and copper furnaces from the Beckett & McDowell Manufacturing Company. His present shipment will aggregate about 200 tons, and will be followed by others.

Mr. George F. Seward, of this city, has lately returned from Thalpajahua, Mexico, where he proposes erecting amalgamation-works. This district adjoins that of El Oro, which has become a large producer of bullion. Mr. Brunton, of the firm of Taylor & Brunton, is now at the mines of the El Oro Mining Company, increasing the capacity of its mill.

Mr. J. M. Daniel, Superintendent of the Leonera & Huerta Mining Company, of Mexico, reports his safe arrival at the company's mines, near Zacatecas. While in New York, he ordered from the Beckett & McDowell Manufacturing Company quite an extensive hoisting plant to open the mines to a depth of 1000 feet. This will go forward early next month.

LABOR AND WAGES.

The strike of iron-workers, begun, some time ago, in San Francisco, in which a large number of men refused to accept a reduction of 15 per cent in wages, has ended, the manufacturers giving way and the men returning to work at the old rates.

The Trades Union of Ottawa, Can., has petitioned the Dominion Parliament to prohibit Chinese immigration.

The striking miners of Straitsville, Ohio, met February 24th, and decided not to submit to a reduction from 70 cents until the Miners' State Convention has established the State prices. A mass-meeting of striking miners will be held at Sand Run, February 28th. The strikers report an increase of outside aid, and appear confident that they will be able to hold out.

The miners in shafts in Nos. 2 and 3, at Centralia, Illinois, have struck against an order to discontinue the blasting of coal and to take it out in block.

The workmen in the Wabash Railroad machine-shops at Moberly, Mo., have been notified that after February 26th the wages of those receiving over thirteen cents an hour will be reduced ten per cent, and those receiving less than that sum per hour will be reduced five per cent. The men have protested.

The trouble at the Kanawha and Union mines, West Va., is growing more serious. The striking miners paraded February 26th, and numerous fights occurred. The mines are guarded to prevent fires. It is feared that there will be a general uprising of the miners in the valley, in which case serious results will follow. The trouble originated in a reduction in the price paid for mining. The miners struck, and negroes were put in their places.

RAILROAD NEWS.

Judge Lawrence, of the Supreme Court in New York City, has decided that "lands used for railroad companies are subject to assessment for improvements on the same basis as other real estate."

Many years ago, a suit was begun against the Illinois Central Railroad Company for an infringement of letters patent to Cawood for an improvement in the common anvil or swedge-block for welding up or re-forming the ends of iron rails. Last spring, the Supreme Court of the United States ordered, in effect, that a judgment be entered against this company for the payment of $115,138.48 as damages for such infringement from September 9th, 1856, to November 11th, 1872. That sum has been paid out of the income of the last year.

The Delaware, Lackawanna & Western Railroad Company, at the annual meeting, February 24th, re-elected substantially its old board of managers and officers. The salient features of the annual statement, as compared with the business of 1883, are a decrease in gross earnings of $1,507,000, a decrease in net earning of $1,422,000, an increase in interest and rentals of $164,000, and a decrease in the balance of profits applicable to dividends on stock of $901,300. The quantity of coal transported in 1884 was 6,578,665 tons, against 5,519,164 in 1883.

A dispatch from Victoria, British Columbia, says that the local Legislature by a vote of 16 to 7 in a full house, has ratified the agreement entered into between the government and the Canadian Pacific Railroad Company, whereby the latter agrees to make the terminus of railroad at Coal Harbor on receiving a land grant of 6000 acres from the government.

The Marshall & Northwestern Railroad Company, Texas, has at last made the necessary arrangements to build the road, and work has been begun. The road is chartered to run from Marshall to Pittsburg, Texas, and then make connection with the Texas & St. Louis road. This line passes through the fine lumber and iron ore sections of the South.

The freight agents of the Pennsylvania, Alleghany Valley, Lake Shore & Michigan Southern, New York, Pennsylvania & Ohio railroads and branches of each, at a meeting held in Pittsburg, February 25th, decided to reduce the rate on seventh-class freight, iron in its various forms, to Boston 20 cents per hundred pounds; 15 cents to New York; 13 cents to Philadelphia; and 12 cents to Baltimore. It is understood that correspondingly low rates will be given to interior New England, New York, Pennsylvania, and Maryland points.

The Norfolk & Western Railroad Company's statement for January shows gross earnings $230,349.91; expenses, $126,793.60; net earnings, $103,556.31.

It is stated that arrangements have just been made for building the Northern Railroad of Guatemala, which is to run from Fort Barrios, on the Atlantic, to Guatemala City, 230 miles. Work is to be started

soon, and the road is to be finished within two years. The road will run through land rich in minerals.

COAL TRADE NOTES.

CANADA.

PROVINCE OF NOVA SCOTIA.

The fire in the Sydney coal mines, which has been burning for several weeks, is still raging, according to reports dated February 23d ; but its progress has been stopped, and it is thought that by the end of this week the water that is poured into the pit will be high enough to finally extinguish the flames.

The collieries of the General Mining Association at Sydney, Cape Breton, said to be the most extensive and valuable coal mines in Canada, were on fire February 22d, and will probably be a total loss.

COLORADO.

The Colorado Fuel Company, which took a trial lease of the anthracite mines at Crested Butte, at the commencement of the present season, is so well satisfied with results and prospects that it has renewed the lease for a further term of five years.

IOWA.

State Mine Inspector Wilson's coming official report will show the extent of the mining industry in Iowa to be much larger than is commonly supposed, there being 170 incorporated mining companies. Some of them operate several mines. The largest number is in the vicinity of Des Moines, twenty-nine companies being located in Polk County.

OHIO.

McCurdy, Margerum & Co. are putting down a new coal shaft in Sodom. Buildings have been completed and the shaft will soon be ready for operations.

Andrews & Hitchcock are sinking a new coal shaft a short distance west of the abandoned Foster shaft. The shaft will be 240 feet deep to reach the coal, and it is expected that coal will be taken out by July 1st.

The mines at Yorkville have resumed.

Reports from Weatherfield state that Pine Hill mine, which has been idle for four weeks, owing to the cold weather, has resumed. The Leadville shaft is full of water ; no sign of resuming.

The Youngstown Coal Company at Chapman has begun to sink its new mine. It is a slope dipping 30 degrees, and the coal will be reached at a depth of thirty-five yards. The coal is the continued basin of the old Clark mine.

NATURAL GAS.

Drillers at the works of the Cleveland Rolling-Mill Company, boring for gas, are down 1700 feet. Casing is going in to keep out the salt water.

PENNSYLVANIA.

B. F. Rafferty & Co. have effected a compromise with their creditors by agreeing to pay 33⅓ per cent of their indebtedness this month, 33⅓ per cent at the end of six months, and the remainder at the close of the year.

ANTHRACITE.

The Delaware & Hudson Coal Company's collieries at Plymouth, which were shut down some weeks ago, will all be running, it is said, before April 1st.

By reason of the frequent suspensions in the Stanton colliery of the Philadelphia & Reading Coal Company last month, occasioned by the inroads of the water gathering in its workings, the men are to be accorded an increased quota of employment during this month.

The sixty-fourth annual meeting of the stockholders of the Lehigh Coal and Navigation Company was held February 24th. The annual report shows that during 1884 the revenues of the company aggregated $2,048,540.84, and the disbursements, $888,972.30 ; less sinking fund and depreciation on coal improvements, $156,743.36, leaving a surplus for the year of $732,228.94. The following board of managers and officers were elected to serve the ensuing year : President, Joseph S. Harris ; Vice-President, Francis C. Yarnall ; Managers, Edward W. Clark, Francis R. Cope, Fisher Hazard, Charles Parrish, George Whitney, James M. Wilcox, Edward Lewis, T. Charlton Henry, Samuel Dickson, and Edward B. Leisenring.

BITUMINOUS.

The details of the bituminous coal pool have all been agreed upon, and the new rates, which will be much lower than those adopted last spring, will go into effect on March 1st.

The new mines in the Karthaus District, Clearfield County, are working about half-time.

COKE.

Seventy per cent of the seven thousand coke-ovens controlled by the Connellsville syndicate are now in operation, against forty-five per cent during the last year. The improvement in trade gives employment to all the men who were discharged during the dull season.

NATURAL GAS.

A terrible gas explosion occurred a few miles west of Erie, February 20th, with fatal results. One man was killed and another fatally injured. Buildings in the vicinity were badly shattered.

It is stated that the committee appointed to investigate whether or not the natural gas mains at Lawrenceville are in a safe condition at present will report that the pipes, in its opinion, are still unsafe. The pipes have not been taken up as they should have been, nor have the connections been properly examined. As a result, the pipes are leaking as badly as they did before the explosion at the Forks of the Road. The terra-cotta pipes do not obviate the trouble from leakage, and eventually the gas will penetrate through the ground, collect at some point, and another explosion will be the result. Then, again, the same pressure is carried as before the explosion.

WEST VIRGINIA.

It is rumored that the Empire mine, near Piedmont, will soon resume operations.

NATURAL GAS.

A terrific natural gas explosion occurred at Wellsburg February 21st. The explosion was caused by gas leaking in the cellar of a building. This building and one adjoining were blown to atoms. Five people were killed and others were badly injured. Houses several squares away were shattered.

GENERAL MINING NEWS.

ARIZONA.

It is said that miners' wages are now reduced throughout the territory to $3 a day.

PIMA COUNTY—QUIJOTOA DISTRICT.

February 16th, grading was begun for a mill, and will be pushed along as rapidly as possible. The well in the valley is down 300 feet ; water is reached at a depth of 400 feet. An abundant supply is looked for within three weeks. The pipe for conveying the water to the compressor and the mill is on the way, and will be laid as soon as it arrives.

The latest developments reported on the Devon add another property of value to Quijotoa. The ledge on the Devon crops out boldly the whole length of the claim.

Mr. Philips, of San Francisco, representing a party of New York capitalists, has been examining properties in the neighborhood of Covered Wells, and will most probably conclude the purchase of them.

YAVAPAI COUNTY.

Prof. John A. Church sends us the following : At present, the only affairs of importance in this neighborhood are the movements to rehabilitate the Howell Smelting and Mining Company. This concern has a lead furnace, a small mill, and two Frue vanners, situated in the midst of a region that produces iron, lead, and zinc sulphuret ores carrying a moderate amount of gold and silver. In Big Bug, an adjacent cañon, a ten-stamp mill is building, with the first arrangement of graded concentrating machines that has been introduced in this part of Arizona. The ores to be treated are similar to those that will go to the Howell Company ; but at present, the Big Bug mill will not attempt smelting.

CALIFORNIA.

INYO COUNTY.

MODOC CONSOLIDATED.—The superintendent reports, February 14th, that the furnaces have been shut down for want of coal. Five days' run produced 62,718 pounds of bullion, value as follows, namely : Silver, ounces per ton, 16·6 ; gold, per ton, $39.68 ; total value of bullion, $10,954.96. Resumed sinking in the South Lookout mine ; average width of ledge at bottom of winze, three feet ; the ore contains 36 per cent lead, 69 ounces silver, and $12 gold per ton.

MONO COUNTY—BODIE DISTRICT.

CONSOLIDATED PACIFIC.—There is no material change to note in the ledge. It remains about the same in size and quality as at last report. The walls, however, and the vein-matter that is found in contact with the vein, are changing some, and begin to show signs of proximity to the cross-course for which they have been running. The vein also shows signs of turning slightly from its true course, probably by the same stratum that carries the Fortuna vein. The cross-cut is in 28 feet, and still cutting very good-looking stringers of quartz.

STANDARD CONSOLIDATED.—There were extracted and shipped to the mill 474 tons of ore during the week ended February 14th, and received 675 ounces of crude bullion, and shipped to the company $12,202.99. The stopes show no important change.

SAN BERNARDINO COUNTY.

SUE.—The owners have disposed of one half of their interest in the mine. The quartz mill at Resting Springs is to be removed to the mine and increased to a capacity of fifteen stamps, and is to be used in crushing the ore from the Sue and other mines of the company.

SIERRA COUNTY.

SIERRA BUTTES.—William J. Bunt, an employé of the company, was crushed to death by a cave in the mine, October 14th, 1883. The widow of Mr. Bunt began an action against the mining company in the United States Circuit Court to recover $30,000 damages for the loss of her husband. The case has just been decided before Judge Sabin by a jury, who awarded the plaintiff $6500.

CANADA.

A company has been organized to erect smelting-works at Ironside, and construct a narrow-gauge line of railroad from Gatineau Point to Whitefoot Lake, a distance of forty miles. Application will be made to Parliament for a charter during the present session. The capital of the company will be $500,000.

COLORADO.

BOULDER COUNTY.

POOR MAN.—Developments made show a large body of ore.

CHAFFEE COUNTY.

COLORADO MICA MINING COMPANY.—This company has been incorporated with a capital stock of $500,000. The operations will be carried on in Chaffee County, and the principal office will be at or near Poncha Springs.

SEDALIA.—It is stated that the Orford Copper and Sulphur Company, of New Jersey, has offered thirty dollars a ton in advance for 100 tons of ore from this mine, delivered on the cars at Salida.

CLEAR CREEK COUNTY.

It is stated that a mill of the Nichols patent, with Sharpneck steam stamps, will be erected the coming season, at Dumont, for the purpose of treating low-grade ores.

COLORADO UNITED.—A circular, signed A. J. Smith, and dated February 2d, has been issued to the shareholders : "At length you have entered into possession of your property, consisting of thirty-six mines embraced in one large set, and situated in one of the richest mineral districts in Colorado, and this without firing a shot or being a dollar out of pocket. For more than seven years, these mines, covering over 60,000 feet on the run of the lodes, have been controlled and held by Mr. W. A. Hamill, without the slightest chance appearing of your ever being able to release them. History fails to discover a parallel, and had you been aware of the meshes that surrounded the property, you would have deemed it but a hopeless task to have attempted to disentangle them. The votes which you from time to time so kindly conferred upon me were rendered abortive, and it was not until my friend Major Reed came upon the scene that daylight appeared ; and it is only fair to him to say that, through his tact, judgment, and ability, have my efforts been consummated ; even Horace Davey, Q.C., whom I consulted, advised me to desist, as I was bringing a flood of litigation upon myself. But having for two years been occupied in the matter, and being in possession of reliable information that the mines could easily pay twenty per cent, and having put my hand to the plow, I could not with honor turn back. In conclusion, I would advise that three hundred to four hundred men be put at once to work, as there are places to put them in. Mine the ore yourselves, and not on lease, and for the future retain the control in your own hands."

SHAFTEE.—This company has been incorporated under the laws of New York, with a capital stock of $100,000. The principal business office will be in New York City. Operations are to be carried on in Clear Creek County. The principal Colorado office is in Idaho Springs, and J. H. Shepherd of that place is the resident agent.

CUSTER COUNTY.

BASSICK.—Great trouble is still experienced in securing an adequate amount of water to operate the concentrator, but the mine is worked with a full force. The shaft is down 1400 feet, and every thing in the way of machinery is powerful enough for sinking to much greater depth.

DOLORES COUNTY.

RICO REDUCTION COMPANY.—The managers have begun to purchase all desirable ores offered.

RICO TUNNEL COMPANY.—The projectors of the enterprise to run a tunnel into Expectation Mountain have held a meeting, and decided to incorporate at once and to begin actual development at as early a date as practicable.

GILPIN COUNTY.

CENTRAL UNION.—A depth of nearly 500 feet has been reached in the shaft sinking on the Galena lode. The pitch of the crevice is to the north. The winze sinking in the east level of the Bugher mine, worked by the same company, is showing up well, indicating that it is sinking through a good body of ore.

CALIFORNIA.—The main shaft has reached a depth of over 1800 feet, and cutting plats for the 1800-foot station has begun.

HINSDALE COUNTY.

A plan is formulating for the establishment in Lake City of a small sampling-works.

CROOKE MINING AND SMELTING COMPANY, LIMITED.—It is probable that the company will be sold out under the Farmers' Loan and Trust Company (New York City) mortgage. In that case, the old company would again come in possession. A proposition has been made to "Uncle" John Crooke, says the Lake City *Mining Register*, that he would no doubt accept if all the local debts of the company were satisfied.

LAKE COUNTY.

ANTIOCH MILL.—The company has ordered ten stamps to its mill from Montgomery & Cory, of Denver. The old stamps now in the mill will be remodeled to conform to more modern ideas from plans furnished by the above firm.

CHRYSOLITE.—The alterations and repairs on the mill will be completed in about two weeks, when the mill will be in shape for continuous work on the low-grade ores of the mine and its dumps.

NEW PITTSBURG.—The lessees of this property have purchased and are now putting up very complete hoisting works. Messrs. Montgomery & Cory, the well-known engineering firm of Denver, have the contract for the entire plant, and the erection of the same.

PARK COUNTY.

MUDSILL.—It is said that arrangements for starting up this mine have been nearly completed in the East.

PITKIN COUNTY.

The smelter and all the prominent mines near Aspen have been closed, owing to some difficulties between the owners. A portion of the owners in the Emma mine, the largest producer in the camp, have taken possession of the property by armed force, and intend to operate it. This mine was closed down at the same time that the others were; but the minority portion of the owners were opposed to it, and they resolved to assert their rights at all hazards. The whole cause of the trouble is the fact that Jerome B. Chaffee and D. H. Moffat have purchased the Durant claim, which covers the apex of the lode on which are situated the best mines in the camp, and it is generally understood that the owners of the Durant claim are going to make an effort in the courts to gain control of the mines on the side of the mountain below by virtue of having possession of the apex. This would take in the Emma, Aspen, and a portion of the Vallejo mines. These mines are owned by J. B. Wheeler, Deveraux, Gillespie, Rucker, and others. Wheeler, who is the heaviest mine-owner in the camp, also owns a controlling interest in the Spar, Washington, and other claims lying on the same side of Aspen Mountain; and as soon as litigation from the Durant people was threatened, he resolved to stop all work until the difficulty was settled in the courts. Immediately all men at work in the mines under his control were discharged, and the smelter, which is also owned by him, was stopped. Naturally, the camp was thrown into an uproar. But while Wheeler owned a controlling interest in the mines named, some of the lesser owners did not agree with him in the shutting down of the mines, and for this reason forcible possession of the Emma mine was taken by Gillespie, Rucker, and others.

PUEBLO COUNTY.

SILVER STEEL.—This group of mines, located about four miles east of Pueblo, is attracting much attention.

DAKOTA.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I wish to state, through the JOURNAL, that I have made no reports on any tin properties in the Black Hills, excepting upon those belonging to the Harney Peak Tin M. M. and M. Co., to that company. I make this statement, as my name is being used by other parties without my authority or consent. G. E. BAILEY,

Sup. Harney Peak Tin M. M. and M. Co.

NEW YORK, Feb. 28.

LAWRENCE COUNTY.

FATHER DE SMET.—The secretary reports, under date of January 5th, as follows: Inclosed please find express company's receipt for bar No. 201, containing 1183·20 ounces gold, the result of clean-up of the mill for the final run in January, making a total of 2104·95 ounces for the month's yield. The character of the ore milled this past month has not been quite up to the usual standard, owing to some of the principal stopes on the third level falling off some in quality, and the rough weather compelling us to work more from lower-grade places than otherwise would have been done. However, I think the average will come out all right in the end, as the general appearance of ore-bodies is encouraging and promises well for the future. Have begun breasting out north in west cross-cut ledge, third level, and expect to open out a good-sized chamber there. The report for the week ended February 15th shows ore extracted from first, second, and third levels, 2050 tons. Ore milled, 2100 tons.

PENNINGTON COUNTY.

CEDAR RAPIDS GOLD MINING COMPANY.—The Cross forty-stamp mill has been purchased and will be moved to the Golden Summit mine, owned by this company. The question of a water supply for the mill seems to have been partially settled at least by the sinking of the 130-foot shaft and cross-cutting, as sufficient water is pumped from the workings to supply a number of stamps.

MEXICO.

Advices from Catorce state that the shaft called La Purisima, in which work has been actively carried on for over ten years past, has been successfully completed.

Reports from Mulege, Lower California, say that the copper mines of Santa Agueda have been sold to a French company for $550,000.

MICHIGAN.

COPPER MINES.

PENINSULA.—It is stated that the principal shareholders of the company are using their utmost endeavors to raise enough money to pay off its indebtedness, and that they intend to turn over the entire property to the creditors in case they fail to raise the funds necessary to discharge the company's debts.

GOLD MINES.

ANGLO-AMERICAN LAND AND MINERAL COMPANY.—This company has been incorporated with a capital stock of $1,000,000, of which $50,000 is said to be paid in, for the purpose of developing some gold and silver properties.

ROPES.—Fourteen tons of concentrates have been shipped to Aurora, Illinois, for treatment. They are rich in gold and silver. There is talk by the management of erecting a plant for treating the concentrates at home, and also for making sulphuric acid from the pyrites.

MONTANA.

LEWIS & CLARKE COUNTY.

HELENA MINING AND REDUCTION COMPANY.—Mr. A. Raht has been appointed General Superintendent, to fill the vacancy occasioned by the resignation of Mr. John Longmaid.

MONTANA COMPANY, LIMITED.—The following circular has been sent to the shareholders: By the circular, dated 29th January [and to which reference was made in the ENGINEERING AND MINING JOURNAL at the time], you have been informed that the directors have resolved to exercise the powers conferred under the articles of association, by issuing 3000 mortgage debenture bonds of £20 each, the proceeds of which will be devoted to the repayment of Mr. Thomas Cruse's mortgage and interest thereon, of the advances from the company's bankers in Montana, and of other liabilities of the company, amounting in all to about £58,000, leaving a small surplus in hand. The bonds will be secured by a first mortgage on the whole of the company's mining and other properties at Marysville, in the Montana Territory of the United States of America. The mortgage deed will be held by Messrs. Martin Ridley Smith, Abraham H. Phillpotts, and Frederick Youle as trustees for the bondholders. The bonds will be of £20 each, issued at par, and carrying interest at the rate of eight pounds (£8) per cent per annum, payable quarterly, on the usual quarter days. The interest will commence from the 25th of March, 1885. The company has 15,817 shares unallotted of the authorized capital, and the bondholders will have the option, up to the 29th of September, 1885, of taking repayment to the extent of 50 per cent of the bonds they hold in ordinary shares of the company at par (£2 per share), to be allotted and issued as fully paid-up shares; the bonds to be paid off on the 25th of March, 1888, or earlier, at the option of the directors of the company, on six months' notice being given to the bondholders of such intended repayment. The entire amount, £60,000, of the proposed issue of bonds has been subscribed for by influential parties interested in the company; but the directors have stipulated that in the event of other shareholders desiring to participate in the issue, the present subscribers will accept a *pro rata* allotment with all other shareholders who apply for the bonds. In accordance with the foregoing arrangements, the directors are now prepared to receive from the shareholders applications for these debenture bonds. The payments will be as follows: £2 10s. on application; £2 10s. on allotment; £15 on the 25th of March, 1885, in exchange for bond; £20 value per bond. Reports received directly from the mine state that excavations are making preparatory to adding a series of Frue vanning machines for catching sulphurets that now pass the pans. With this improvement, the plant will be complete, and the results, judging from the present working of the mill, satisfactory.

SILVER BOW COUNTY.

The Orford Copper and Sulphur Company, of New Jersey, is buying ores from the Butte mines.

AMY SILVERSMITH.—A strike has been made on the 100-foot east level, at a point about 50 feet from the shaft. The vein in the face of the drift is 14 inches wide, and surpasses in richness any thing ever before seen in the claim.

NEVADA.

ESMERALDA COUNTY.

COLUMBUS.—The mine is still in litigation.

HOLMES.—At the annual meeting of the company, held at San Francisco recently, the directors resolved, in regard to the 20,000 shares that came into the company's hands for delinquent assessments, that, no matter how prosperous the mine may turn out to be, this stock can not be put on the market without a published notice of call for a stockholders' meeting to discuss such action. There was no opposition to the meeting, and the following directors and officers were chosen: Ramon E. Wilson, President; W. E. Sell, Vice-President; W. S. Hobart, A. W. Rose, Jr., Charles T. Bridge (Secretary), and James Cross (Superintendent). A resolution was adopted ratifying the acts, contracts, etc., of the directors during the past year. It was stated by one of the directors that the mine was getting into good condition. A great deal of exploration-work has been done in the past year, and a good deal of ore has been accumulated. The work of the past five months has been devoted to getting the mine into good shape. During that time, the mine has only run in debt about $30,000, not counting repairs to the lower mill. One of the company's mills is now engaged in crushing ore from the Mount Diablo Mining Company, and earning a handsome return, and the other is crushing Holmes ore. The first shipment of bullion since the starting up of the mill at Belleville was made February 14th. The mill is running on half-time at present, but will start up on full-time next month.

EUREKA COUNTY.

EUREKA CONSOLIDATED.—The improvements going on at the company's works have assumed tangible form, and the work of mixing ores is in active progress. The mixing-floor, which is 101 by 22 feet, has already on it mixed ores to the depth of 15 inches, and enough ore and flux are in an adjoining room to make in all at least 120 tons. When this plant is complete, several trap-doors in the floor will be opened and the mixture will be allowed to drop into a large bin the entire length of the structure. When the furnace is completed and ready to receive ore for smelting, self-dumping cars will be filled from doors in the bottom of the bin, and they will then be drawn up over a cable tramway to the floor of the furnace building. The

mixing-floor is sufficiently capacious to accommodate at least 500 tons of ore. Every thing about the works will be so arranged that no shoveling of ore will be required from the time it is mixed until it is fed to the furnace, and it is the opinion of Superintendent Robbins that the company will be able to handle ores much cheaper than has ever been known in this section when all the improvements are completed. The statement for January shows that the furnace worked only five days from January 1st to January 5th; $31,500 net received in full settlement for all claims against the contractors for machinery at the Locan shaft.

LANDER COUNTY.

MANHATTAN.—The company charges for reducing ores $35 per ton, allowing in bullion 80 per cent on ores the assay value of which is $400 per ton or less, and 82 per cent on ores of a higher grade. It will also pay for the following grades the percentage attached, free from milling, bullion discount, and tribute charges, namely: Ores assaying $40 to $44 per ton, 10 per cent; ores assaying $45 to $49 per ton, 15 per cent; ores assaying $50 to $54 per ton, 20 per cent; ores assaying $55 to $59 per ton, 22 per cent; ores assaying $60 to $70 per ton, 24 per cent; of the assay value in each case.

STOREY COUNTY.

The following statement of the ore and bullion product of the mines on the Comstock and in Storey County for the quarter ended January 1st, 1885, is taken from the abstract statement in the County Assessor's office:

Ore product, 47,028 tons 315 pounds. Gross yield or value	$637,383.31
Total cost of extracting, transportation, and milling	667,195.15
Amount deducted as provided by law	515,133.95
Net yield or value on which taxes are levied	122,249.35
Total amount of tax	3,774.24
Tailings, 7806 tons. Gross yield, or value	$36,171.53
Total cost of milling and expenses	30,680.84
Amount deducted as provided by law	30,680.84
Net yield or value on which taxes are levied	5,490.68
Total tax	181.46

NEW MEXICO.

The Pueblo smelting-works have established a branch sampler at Deming.

GRANT COUNTY.

MCNAIR.—These works, building at Silver City, are nearing completion. The main furnace and the calcining furnaces will be fired up soon; but as the drying process has to be gone through with, the works will not start up to make a regular run for two or three weeks yet. The present structure is built merely for a test. The ore from the Seventy-six mine will be treated at these works.

OLD MAN.—The new hoisting-works are up and work will begin with an increased force. The mine is reported showing up well, all the bodies of ore holding their own as work is pushed.

WISCONSIN.

GERMANIA MINING COMPANY.—On this property which is located on the east half, southwest quarter of section 24, 46, 2 east, a strike of considerable value has been made. The vein has been traced 400 feet. The quality of the ore is of the hematite specular variety. The Lake Shore Railroad runs within a quarter of a mile of the mine.

WYOMING.

LARAMIE REDUCTION-WORKS.—Prof. Robert McKenzie, of Laramie, who has been connected with the surveyor-general's office, has accepted the superintendency of these works, which are to be erected in the spring.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Feb. 27.

The mining market shows no improvement, but the feeling toward mining as an investment is growing better, and the outlook for the future presents some favorable features. The New York Mining Stock and National Petroleum Exchange is still carrying on its fight with the New York Petroleum and the Stock Exchange. A committee is now at work, and a plan of consolidation has been agreed upon with the former, and negotiations are going on to secure an amicable understanding with the latter. The New York Mining and National Petroleum Exchange's gratuity fund amounts to $226,227.59, an average of $161.43 for each of the 1400 members. The 1100 members of the New York Petroleum Exchange and Stock Board will pay into the gratuity fund an average of $161.43 each, making $177,573, and swelling the gratuity fund to a grand total of $403,800.59.

The dealings during the week have amounted to 50,951 shares, as against 49,730 shares for the preceding week, showing an increase of 1221 shares. The prices, on the whole, have been firm.

The weakness in Horn-Silver has been the most prominent feature of the market. The stock opened at $2.20 in the beginning of the week, went down steadily, and closed at $1.75, with indications that a still lower figure will be reached in the near future; the sales have been large, amounting to 8695 shares. Ontario sold at $17.13@$17.50 ex-dividend.

Standard Consolidated has been in demand, and sales of 2455 shares are recorded, at prices ranging from 70@98c. Consolidated Pacific has also been active at from 88@94c., with sales amounting to 3800 shares. Bodie Consolidated and Bulwer have been weak, the former selling at $2.15, and the latter at 3c., assessment unpaid, and from 25@26c., assessment paid. The transactions in Plymouth Consolidated were the same as last week, 1425 shares, at from $15.75@$16.38.

The financial statement of the Eureka Consolidated for January shows that the company had cash in bank to the amount of $10,933.62. Improvements are making at the works in Eureka, and an increased production may soon be looked for. Only 1200 shares were sold during the week at from $2.50@$2.75. Navajo sold at from 90c.@$1. In the Comstock shares, Hale & Norcross has shown an advance, selling from $4.50@$6. Consolidated California & Virginia shows a large business, with sales of 9866 shares at from 27@44c., assessment paid. Sutro Tunnel sold at from 10@13c., 9400 shares changing hands. Of Chollar, 700 shares were sold at $2.75. Sierra Nevada, Grand Prize, and others record a small business.

The Colorado stocks have been almost entirely neglected. Bassick sold at from $2.90@$2.95. Little Chief, at 25c. Little Pittsburg, at 23c. Climax, at 2c.

A few sales of Alice were made at from $2@$2.10. Silver King, $4. Homestake, $10. Father de Smet, $5.75. A complete summary of the market will be found elsewhere.

Mr. G. de la Bouglise, a French mining engineer of high standing, arrived by the steamer St. Germain, on his way to the Golden River mines (formerly Sucker Flat, Shilbach), Placer County, California. These mines were lately bought by a syndicate of French capitalists, and Mr. de la Bouglise will make arrangements to have them operated immediately.

MEETINGS.

The annual meetings of the following companies for the election of trustees and the transaction of business will be held at the times mentioned:

Andover Iron Company, No. 240 South Third street, Philadelphia, Pa., March 10th, at eleven o'clock A.M.

Atlantic Mining Company, No. 76 Wall street, New York City, March 10th, at twelve o'clock M.

Bonanza Development Company, Clarendon Hotel, Leadville, Colo., March 11th, at two o'clock P.M.

Fort Pitt Coal Company, No. 1010 Penn avenue, Pittsburg, Pa., March 17th, between two and four o'clock P.M.

Preston Coal and Improvement Company, No. 227 South Fourth street, Philadelphia, Pa., March 4th, at twelve o'clock M.

Robinson Consolidated Mining Company, No. 54 William street, New York City, March 3d.

Ropes Gold and Silver Mining Company, Ishpeming, Mich., March 9th, at half-past seven o'clock P.M.

Trout River Mining Company, office of W. W. Butterfield, Houghton, Mich., March 23d, at three o'clock P.M.

United States Gold Mining Company, No. 72 Broadway, Room 37, New York City, March 11th, at twelve o'clock M.

DIVIDENDS.

Alice Gold and Silver Mining Company, of Montana, has declared a dividend (No. 14) of 12½ cents a share, or $50,000, payable at the Farmers' Loan and Trust Company, New York City, March 2d.

Charleston Mining and Manufacturing Company, of South Carolina, announces a quarterly dividend of two dollars and fifty cents a share, payable March 2d.

Colorado Central Consolidated Mining Company, of Colorado, has declared a dividend of five cents a share, payable at the Farmers' Loan and Trust Company, New York City, March 16th.

Delaware & Hudson Canal Company has declared a quarterly dividend of one and a half per cent on the capital stock, payable at the National Bank of Commerce, New York City, March 10th.

PIPE LINE CERTIFICATES.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report that the past week has been the most active for some time past, with higher figures. The situation in the field is more bullish than ever, owing to the failure of the Murphy and McLaughlin wells, which cut off the possible extension of the Thorn Creek field to the southeast. The old districts are gradually declining in their production, and until some "wild-cat" well opens a new district, the production is likely to decline. Refined has been advanced within ten days from 7⅝c. to 8c., and the European demand for it is unusually heavy for the season. The certificates have been bought up by a bull clique, and they refuse to loan them except at a premium. The market closed to-night at 80⅛c., but we believe will go higher to-morrow. The lowest price during the week has been 76¼c., and the highest 85c.

The following table gives the quotations and sales at the New York Mining Stock and National Petroleum Exchange:

		Opening.	Highest.	Lowest.	Closing.	Sales.
Feb.	21	$0.76¼	$0.78⅛	$0.76¼	$0.76⅞	6,659,000
	23	.....	.....	.....	.....	.....
	24	.78	.78⅜	.76½	.78⅛	4,402,000
	25	.79¼	.81½	.79	.81½	6,267,000
	26	.82	.85	.81	.82⅛	9,355,000
	27	.82	.8 7⁄8	.79½	.80⅛	6,148,000
Total sales						32,831,000

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Feb. 20.	Feb. 21.	Feb. 23.	Feb. 24.	Feb. 25.	Feb. 26.
Albion	.....	.....	.....	.....	.....	.....
Alpha	.....	.....	.....	.....	.....	.....
Alta	.25	.....	.....	.25	.....	.30
Argenta	.....	.....	.....	.....	.....	.....
Bechtel	.....	.....	.....	.....	.....	.....
Belcher	.....	.....	.....	.....	.65	.....
Belle Isle	.....	.....	.....	.....	.....	.....
Best & Belcher	.55	.50	.....	.90	.95	.90
Bodie	2.12½	2.00	.....	2.00	2.00	2.12½
Bullion	.....	.....	.....	.....	.....	.....
Bulwer	.....	.....	.....	.....	.....	.....
Chollar	2.62½	2.75	.....	2.75	2.75	2.62½
Con. Pacific	.95	.95	.....	.95	.95	.....
Con. Cal & Va	.25	.....	.....	.30	.40	.40
Crown Point	.....	.80	.....	.80	.70	.....
Day	.....	.....	.....	.....	.....	.....
Elko Cons	.....	.....	.....	.....	.....	.....
Eureka Cons	.....	.....	.....	.....	.....	.....
Exchequer	.....	.....	.....	.....	.....	.....
Gould & Curry	.55	.50	.....	.75	.70	.70
Grand Prize	.....	.....	.....	.....	.....	.....
Hale & Norcross	3.87½	4.00	.....	5.25	5.25	5.00
Independence	.....	.....	.....	.....	.....	.....
Martin White	1.37½	.45	.....	.....	.45	.....
Mexican	.20	.20	.....	.30	.35	.25
Mono	.....	.....	.....	.....	.....	.....
Mount Diablo	.....	.....	.....	3.62½	.....	3.50
Navajo	1.00	.....	.....	1.00	1.00	1.12½
Northern Belle	.....	.....	.....	.....	.....	.....
North Belle Isle	.....	.....	.....	.....	.....	.....
Ophir	.15	.10	.....	.25	.30	.25
Overman	.....	.....	.....	.....	.....	.....
Potosi	.75	.80	.....	.80	.75	.80
Savage	.95	1.00	.....	1.50	1.62½	1.50
Scorpion	.....	.....	.....	.....	.....	.....
Sierra Nevada	.20	.....	.....	.30	.30	.35
Silver King	.....	.....	.....	.....	.....	.....
Tip-Top	.....	.....	.....	.....	.....	.....
Union Cons	.25	.20	.....	.30	.30	.35
Utah	.40	.45	.....	.....	.....	.....
Wales Cons	.....	.....	.....	.....	.....	.....
Yellow Jacket	1.25	1.25	.....	1.25	1.25	.....
.....	.....	.....	.....	.....	.....	.....

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, Feb. 26.

There has been but little doing in mining stocks the past week; in fact, it has been the dullest week of the year. Orders are scarce to buy or sell, and commissions would hardly pay the expenses of one broker; but when divided among one hundred and fifty, the proportion to each would not pay for a dinner. Calumet & Hecla shows sales of one share at $159 and of two at $157. Quincy has been the only active stock, but recorded sales only aggregate about 200 shares; the price has been very steady at $29¾@$30. Franklin declined from $7 (February 4th) to $6½ on small lots. Atlantic advanced from $6½@$7, on sale of 5 shares only. The rest of the list was entirely neglected.

In silver stocks, Catalpa sold at 20c. Dunkin, 19@20c. Bowman was boomed up to 20c. early in the week, but declined later, with 16c. as best bid, 17c. asked. Consolidated Pacific at one time was 98c. bid, without sales.

In miscellaneous stocks, there is but little activity. American Electric and Illuminating Company declined from $2@$1⅛, owing to the company declaring

a dividend payable in scrip, instead of the usual cash dividend. Brunswick Berth dull at 16@20c. The water-meters were firmer for New England at 45@47½c. Standard, steady at 30c.

3 P.M.—There was no special change in the market this afternoon. Calumet & Hecla was offered at $155½. Quincy sold at $29½. Osceola, offered at $10.

BULLION MARKET.

NEW YORK, Friday Evening, Feb. 27.

DATE.	London.	N. Y.	DATE.	London.	N. Y.
	Pence.	Cents.		Pence.	Cents.
Feb. 21	*	106½	Feb. 25	49⅛	106¾
23	48 15-16	Holiday.	26	49⅛	106¾
24	49⅛	106¾	27	49⅛	106⅞

* 48 15-16@49.

Foreign Bank Statements.—The governors of the Bank of England, at their regular weekly meeting, made no change in the bank's minimum rate of discount, and it remains 4 per cent. During the week, the bank gained £523,251 bullion; but the proportion of its reserve to its liabilities was reduced from 58 to 46 13/16, against 40⅛ per cent at this date last year. February 26th, the bank gained £30,000 bullion on balance. The weekly statement of the Bank of France shows a loss of 758,000 francs gold and a gain of 2,776,000 francs silver. The statement of the Imperial Bank of Germany shows a gain for the week of 14,003,000 marks.

BULLION PRODUCTION FOR 1885.

MINES.	States.	Month of January.	Year from Jan. 1st, 1885.
		$	
*Alice, G. S.	Mont.	94,020	.....
*Belmont	Nev.	10,063	.....
*Boston & Montana, G.	Mont.	31,278	.....
*Chrysolite, S.	Colo.	4,771	.....
*Consolidated Bobtail, G.	Colo.	6,501	.....
*Derbec Blue Gravel, G. S.	Cal.	15,226	.....
*Eureka Consolidated, S. L.	Nev.	27,395	.....
*Father de Smet, G.	Dak.	34,567	.....
*Grand Prize, S.	Nev.	25,150	.....
*Granite Mountain, S.	Mont.	62,900	.....
*Head Center & Tranquillity	Ariz.	18,823	.....
*Hecla Consolidated, G. S. L. C.	Mont.	‡56,905	.....
*Hope, S.	Mont.	5,900	.....
*Lexington, G. S.	Mont.	61,183	.....
*Navajo, S.	Nev.	57,262	.....
*New Pittsburg, S.	Colo.	†7,765	.....
*Plymouth Consolidated, G.	Cal.	85,722	.....
*South Yuba, G.	Cal.	400	.....
*Standard Consolidated, G.	Cal.	†24,799	.....
*Stormont, S.	Utah.	12,550	.....
*Tombstone, G. S. L.	Ariz.	‡48,104	.....
		691,314	.....

*Official. G., gold; S., silver; L., lead; C., copper. Silver valued by the different companies from $1@$1.29·29 per ounce; gold, $20.67. †Net. ‡Not including value of lead and copper.

METALS.

NEW YORK, Friday Evening, Feb. 27.

Copper.—There is a comparative scarcity of copper for immediate delivery and a fair demand.

Lake is worth 11⅛@11¼c.; Baltimore Arizona brands, 11c., and Montana, 10¾c.; Orford, 10¾@11c.; Arizona Pig Copper (96 per cent) sold at 9·65c. The Calumet & Hecla has brought five or six million pounds overland to fill its foreign contracts. The pool price of Lake to consumers in March will probably be 10·4c.

Cable reports to-day quote Chili Bars £47 2s. 6d. They have fluctuated from £47 to £47 5s. during the week. A year ago, they were worth £55 10s. Best Selected was to-day quoted £52. A year ago, it brought £63 10s.

We publish in another column some interesting statistical tables. The fact that 4000 tons of ingots have come from Japan, that 33,000,000 pounds are held by the Mansfeld works, and that English exports are much less than last year, are worthy of especial remark.

Lead.—The market here is dull, with sales of about 300 tons of Chemical lead, mostly St. Jo, at 3⅝c., and about 400 tons Corroding at 3·65c.; but to-day, the best offer that can be obtained is 3·60c. In fact, while producers are firm, buyers are also, and to bring business buyers, figures must be met. Foreign Lead is coming in at 4·35c. This, of course, is for manufacturing and re-export.

Messrs. Everett & Post, of Chicago, telegraph to us as follows to-day:

The market remains about the same—if any thing, a shade weaker. Since our last report, sales of both soft and hard lead have been more free, and several hundred tons have been purchased. However, most holders, anticipating better prices, have withdrawn from the market, and refuse to make sales for future delivery at present prices, which we quote nominally 3·45½c. with bids of 3·47½c. for same brands Refined.

Messrs. John Wahl & Co., of St. Louis, telegraph to us as follows to-day:

The trade of the past week has been very much like that of its predecessors, being remarkable only for its dullness. Not much is done; negotiations are pending, but it seems as though buyers and sellers could not agree. Sellers are offering, but no buyers are to be found. Desilverized sold at 3·50c.; Common at 3·40@3·45c.

Tin.—The price of tin abroad has taken a slight rise, due, doubtless, to *manipulation*, the controlling divinity of this article. Cables to the Metal Exchange to-day quote £78 12s. 6d. spot, and £79 7s. three months; but later private cables quote £79 spot and £79 15s. futures. Here we continue to quote $17.25@$17.50.

Sales of 10 tons March at $17.45 and 10 tons April at $17.40 are reported at the Metal Exchange.

Spelter.—Very little business doing, and prices lower. Domestic brands are offered at 4·25c. and foreign at 4·70c., but little or no business is done. It is possible that a shade below 4·25c. has been accepted.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 27.

American Pig.—There is nothing worthy of note to report; consumers buy only for their immediate wants. "Send us the iron at once for to-morrow or the next day; we shall be out," is the way orders are given. The scarcity of money and the "confidence in future (low) values" induce consumers to put upon manufacturers the burden of carrying the stock. But this same feeling seems to pervade other branches of industry, so that as soon as the long expected and ardently hoped for revival begins, it will make a very sudden large demand on producers. With the opening of navigation, it is hoped more business will be done and a general improvement take place. Prices appear to be at the bottom, and occasionally we meet with some one gifted with a lively imagination, or an extra good digestion, who thinks the "revival" is upon us. Unfortunately, we are not left long in the enjoyment of the pleasing illusion.

We continue to quote Anthracite Pig, No. 1 Foundry, $18; No. 2, $17; Gray Forge, $16—for best Lehigh brands, while other brands are quoted at $14.50@$15 for Gray Forge; $16@$17 for No. 2; and $17@$18 for No. 1. Charcoal Gray Forge has been sold at $16. We may quote: No. 1 Charcoal, $21.50@$23; No. 2, $21@$22.50; Cold Blast, $23.50@$29; Warm Blast, $17.50@$24.50.

Telegraphic advices from Pittsburg to-day quote the following sales:

		C sh.
50 tons	Foundry, No. 1, from Lake ores	$1.[illegible]95
100 "	Mottled Lake ores	14.50
400 "	Foundry, No. 1, native ores	17.50
500 "	Gray Forge, native ores	15.25
800 "	" " " " (cinder)	14.00
50 "	" " anthracite	16 90
100 "	Warm blast charcoal	17.50
50 "	Foundry, No. 2, "	22.50
50 "	Cold-blast, "	27.00

Scotch Pig.—So little is doing in this article, it is scarcely worth quoting. The prices on small lots vary from $18.50 to $22, according to brand. Cable advices report Warrants 41s. 8d. against 42s. 3d. a year ago. Coltness, 54s.; Gartsherrie, 51s. 3d.; Glengarnock, 48s. 3d.; Eglinton, 42s. 9d.

Steel Rails.—We hear of a sale of 2000 tons light sections at Harrisburg, but very little business is doing in the East. Prices are nominally $27@$28 at mills but concessions are made on large orders. Light sections, of course, command higher prices, and at Chicago $29@$30 is quoted.

Philadelphia. Feb. 27.

[From our Special Correspondent.]

The general conditions heretofore referred to still exist in all branches of the iron trade. Brokers and manufacturers are unwilling to admit that their predictions have not been borne out by facts, and insist that the market is on the eve of an improvement. There seems to be no apparent reason for any departure from the hand-to-mouth policy of buying that for months past has deprived the iron trade of special features of interest. The makers of special brands are the only ones who give any thing encouraging. They have sold a good deal of iron, and are endeavoring to place spring output sooner than buyers care to come around voluntarily. Prices are therefore firm. Standard brands of Foundry have been selling since Monday at $18 in a small way. There have been offers from three or four large buyers at $17.50, and sales are probable at $17.75. Some iron that passed for No. 1 was sold at $17.25. Brokers trying to push No. 2 into the market say that prices are a little weaker. It would be hard to give a market quotation; $16.50 and $17 are the ordinary quotations, but No. 2 is likely to weaken. The bar men are still very slow to buy, and have nothing in their yards beyond what current orders call for. A few country makers have been looking up old rails, scrap and forge iron, to make certain mixtures. The average figures for Gray Forge are $14@$16. A few lots of Southern iron were ordered at $15.

Foreign Irons.—A 2000-ton lot of Bessemer iron was ordered at $19. Offers for about 4000 tons have been made at a little under this figure. A 2000-ton lot of 20 per cent Spiegel sold at $25.20, and brokers have offers for two or three more lots at $25.

Blooms.—A few small lots of Charcoal Blooms sold at $51.

Muck-Bars.—One sale of Muck-Bars was made at $27.

Manufactured Iron.—The bar-iron makers say that next month will make up for this month. It is impossible to shade prices any more. There is no general improvement. A few small lots have been sold at prices that have been named for large lots heretofore. The average price is $1.70, although a little less or more is sometimes taken. A few hundred tons of Common iron have been ordered in small lots at about $1.55. Less than $1.50 has been taken in the interior for some little business.

Nails.—Nails are holding their own very fairly, and the makers say they have assurances to justify the statement that there will be no more idle capacity in the nail mills from this out. It is barely possible that they will be able to run steadily. There is less cutting than usual, and a good deal of inquiry and a good deal of confidence, and in general a satisfactory condition both in iron and steel nails. The making of slabs is occupying a good deal of attention, and prices for recent sales show no variation from former quotations. Some makers of steel slabs are endeavoring to secure large contracts.

Sheet-Iron.—There is no change in prices or trade conditions, other than the probability of the placing of some galvanized contracts at prices that have not been mentioned.

Plate and Tank-Iron.—Plate is $2@$2.10; Shell, $2.50; and Flange, $3.50. A number of small orders were booked by different makers this week, but nothing of special interest has occurred. Manufacturers have information of some large requirements, but they do not expect them before the middle or the latter part of March.

Structural Iron.—The Penncoyd Mill of A. M. Roberts, of Manayunk, has resumed work, after an idleness extending from the holidays. A number of orders have been secured, and it is probable that the works will run steadily. Two or three of the structural iron mills are rather bare of orders, but there are negotiations in progress that, it is hoped, will bring sufficient business to allow of constant employment. Prices are $2@$2.10 for Angles, and 3c. for Beams and Channels. Competition is quite close, and any thing like remunerative prices will be held with difficulty. It is known that there is considerable bridge work to be had; but there seems to be a spirit of indifference among prospective buyers as to the placing of orders. The Abbott Iron Company, of Baltimore, will probably be reorganized with capital enough to place steel plant in that mill to better supply the Southern demand.

Wrought-Iron Pipe.—The trade is encouraged by more or less inquiry for spring and summer requirements, and the condition seems to be quite satisfactory, although more business could be taken care of.

Steel Rails.—There are frequent rumors as to large steel rail transactions. One thing is certain, and that is, that not one fourth of the actual business done is made public. Rail-makers are reticent. As to prices, good iron authorities say that the tendency is downward, and that $26 has been taken and would be

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	Feb. 21.		Feb. 23.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.					2.10				2.10	2.00	2.10	2.05	900
Amie Con., Co.													
Argenta													
Bassick, Co.					2.90		2.95	2.90	2.90				850
Belle Isle, Ne.													
Bodie Cons., Ca.	2.15								2.15				750
Breece, Co.													
Bulwer, Ca.	.03								.26	.25	.25		1,400
California, Ne.													
Cal. & Hecla, Mich.													
Castle Creek.													
Chollar					2.75		2.75						700
Chrysolite, Co.											.85		100
Cons. Cal. & Va., Ne.	.30	.28			.27		.35	.30	.41	.40	.44		9,866
Cons. Va., Ne.													
Dunkin, Co.													
Eureka Cons., Ne.					2.50		2.75	2.50	2.75		2.75	2.70	1,200
Father de Smet, Dk.									5.75				25
Findley, Ga.													
Gold Stripe, Ca.													
Gould & Curry, Ne.							.65						300
Grand Prize, Ne.					.14								20
Green Mountain, Ca.													
Hale & Norcross, Ne.					5.00	4.50	6.00		5.25				550
Hall-Anderson, N. S.													
Homestake, Dk.							10.00						75
Horn-Silver, Ut.	2.20	2.10			2.10	1.95	2.10	1.80	1.85	1.80	1.80	1.75	8,695
Independence, Ne.	.02												500
Iron Silver, Co.													
Leadville C., Co.													
Little Chief, Co.									.25				500
Little Pittsburg, Co.					.23								100
Martin White, Ne.					.45								200
Moulton.													
Navajo, Ne.					1.00	.90	.90				1.00		1,100
Northern Belle.													
North Belle Isle, Ne.													
Ontario, Ut.							17.50	17.38			17.25	17.13	150
Ophir.													
Plymouth	16.13	16.00			15.88	15.75	16.25	15.88	16.25	15.88	16.38	16.00	1,425
Quicksilver Pref., Ca.													
" Com., Ca.													
Robinson Cons., Co.													
Savage, Ne.													
Sierra Nevada, Ne.	.24						.35	.30					720
Silver King, Ar.					4.00				4.00				270
Spring Valley, Ca.													
Standard, Ca.					.70		.76	.75	.98	.75	.90	.80	2,455
Stormont, Ut.													
Up Top, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	Feb. 21.		Feb. 23.		Feb. 24.		Feb. 25.		Feb. 26.		Feb. 27.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Albion													
American Flag													
Barcelona, G.					.10								200
Bechtel Con., G.													
Belvidere													
Best & B'cher, G. S.													
Big Pittsburg, S. L.													
Bradshaw, S.													
Bull-Domingo, S. L.													
Cal., B. H., G.					.90		.90						500
Central Ariz'na, S.													
Climax, Co.									.02				500
Colorado Central.													
Cons. Imperial.													
Con. Pacific	.93	.92			.92	.90	.91	.90	.92	.88	.94	.91	3,800
Dahlonega													
Decatur													
Durango, G.													
Eastern Oregon													
Goodshaw, G.													
Harlem M. & M. Co.													
Hortense, S.													
Kossuth.									.06				400
Lacrosse, G.					.10								300
Mariposa Pref., G.													
" Com., G.													
Mexican, G. S.													
Mono													
New Pittsburg													
North Standard, G.													
N. Horn-Silv'r, S. L.													
Pri'nt'l & Miller, S.													
Rappahannock, G.					.07								3,000
Red Elephant, S.													
Ruby, of Arizona.													
Silver Cliff, S.													
Sonora Con.													
South Bodie, G.													
South Bulwer, G.													
South Hite.													
South Pacific.													
State Line, 1 & 4, S.													
" Nos. 2 & 3, S.													
Sutro Tunnel	.10				.12	.11	.13	.12			.12		9,400
Taylor Plumas													
Tioga													
Unadilla, S.													
Union Cons., G. S.													

Tables giving dividends and assessments will be printed the first week of each month. Dividend shares sold, 32,851. Non-dividend shares sold, 18,100.

readily taken for all large contracts that could be secured.

Old Rails.—There is a good deal of inquiry, and more business on the basis of $24.50.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 27.

Anthracite.

The anthracite production for the past week was 329,634 tons, and for the year to date 2,693,531, or 521,014 tons less than in the corresponding period last year. The effect of this reduction in output, and of the increased domestic consumption, due to the remarkably persistent cold weather, has lessened stocks everywhere and has produced an actual scarcity at many points. The quotations for free-burning or Wilkes-Barre, Scranton, Pittston, and Lackawanna coals are as follows :

Broken and Egg, $3.20@$3.35; Stove, $4.10@$4.25; Chestnut, $3.50@$3.65; Pea, $2.25@$2.50; all per ton f. o. b.; and these figures are well maintained, the Delaware & Hudson quoting $3.30 for Broken and Egg, $4.15 for Stove, $3.65 for Chestnut *net* at Weehawken. Most of the companies have filled their quota for February, and the present indication is, that the March quota will not be exceeded.

An impression seems to prevail in some quarters that prices will not be lower in the spring. The Reading Company has issued the following price-list for March: The rates for White Ash coal at Schuylkill Haven are as follows: Lump, Steamboat, Broken, and Egg, $2.60; Stove and Small Stove, $2.85; Chestnut, $2.75; Pea, $1.25; and Buckwheat, 80 cents.

This company will work its collieries three-quarter time in March.

Bituminous.

It is always agreeable to "prophesy smooth things," and always a thankless task to record the truth when it is disagreeable. Nevertheless, a paper that would only retail colorless nothings or gently refer to disagreeable transactions when they are a month old can be of but little use or influence in directing trade or with live business men.

We have referred on several occasions to the soft coal "pool" of the Pennsylvania and Baltimore & Ohio railroads. This agreement nominally comes into force March 1st, and it "establishes" the price of "pool coal," supposed to include all Cumberland, Clearfield, and Norfolk & Western coals, at the following figures: At Baltimore, $2.70; Philadelphia, $2.80; New York, $3.25; Boston, $3.50 per ton f. o. b.; and this arrangement is based upon the intention of allowing about 80 cents a ton for the coal at the mines, the remainder being freight and shipping charges, the pool roads (Pennsylvania Railroad and Baltimore & Ohio Railroad) paying the local roads such rates as they can arrange for, and in all cases more than they themselves get on this through business.

Thus, on "through" coal going north of the shipping ports and outside the Capes, the freights are $1.30 per ton from the mines (whether Cumberland or Clearfield) to Baltimore, and from the mines to Greenwich $1.38 per ton, and $2.05 to Amboy. But for coal going to United States points south of the shipping ports, or to Cuban and other foreign ports, the railroads charge $1.55 per ton to Baltimore or Greenwich; while on coal for local consumption in Baltimore, or Baltimore harbor and Chesapeake Bay delivery, that is, on business inside the Capes, the Baltimore & Ohio Railroad gets $1.75 per ton freight; and for business inside the Capes, the Pennsylvania Railroad gets for coal delivered to the river front of Philadelphia, $1.85 per ton.

The $1.30@$1.38 freights on "through" coal, after paying lateral roads and other charges, leave the pool roads but little over 3 mills a ton a mile—a rate so low, so near actual cost of carrying, as to inspire in some the belief that "pool prices" must necessarily be maintained. This reminds one of the story of the man who was arrested and put in jail for some alleged violation of the law, and having sent for his lawyer and explained what he had done, was assured that "they can't do that, there is no law under the sun can put you in jail for that." "But," responds the client, "here I am." So, notwithstanding the apparent impossibility of getting below "pool prices" we have been recording, most of the contracts made have been at figures far below the pool rates. How is it done?

The Vanderbilt or Beech Creek coal has been offered and sold at $2.75 in this harbor, or 50 cents below the pool. Then it is said, "The Vanderbilt coal is not in the pool." Then Norfolk & Western has unusual facilities for shipping that give it an advantage that it may share with the purchaser. Now, the largest of the Clearfield companies is said to have just made a contract with the West Shore road, for at least 100,000 tons, at, it is said, 9 cents below the Vanderbilt coal. And we learn that the Pennsylvania Rail road does not bind itself in any way as regards freights on any coal delivered by *all rail*, but only on tide-water coal actually shipped in boats, etc.

Then the Cumberland companies take contracts considerably below pool prices, but reserve the right to ship from any port, and every one knows Georgetown is outside of the pool arrangement, and hence it is easy without any great strain on the imagination, to see how the pool, like all such combinations, is a device by which the active and favored ones can take the trade. Nominally a breach of the understanding in selling pool coal below "pool" prices bears with it the penalty of having the reduced freight rates withdrawn, and local rates imposed on the offender. In practice, however, there is no penalty enforced. In addition to the large West Shore contracts, we learn of a good deal of business done in a very quiet way, at pool prices, where the purchaser can be induced to believe in them and at less than pool prices where he laughs. There is the promise of a pretty large business from the Cumberland and Clearfield districts this year, and the prices are so low as to offer no inducement to the Chesapeake & Ohio or other distant coals to come to tide-water

Philadelphia. Feb. 27.

[From our Special Correspondent.]

This month's quota of anthracite coal has been filled, and all production is therefore discontinued. The Schuylkill Coal Exchange has arranged that all collieries in the Schuylkill region are to work three-quarter time during March. This policy, it has been concluded, will be more acceptable to all concerned than to push production through by full-time. The Lehigh & Schuylkill Exchange has been in negotiation with the furnace interests for some time, relative to a decline in prices. Some very urgent statements have been made by the iron men relative to the necessity for a reduction, and the result is, that the price adopted by the two Exchanges is $2.45 a ton, a reduction

of 30 cents. A reduction of 50 cents was asked for and expected on anthracite lump to the furnace-men along the lines of the Reading and Lehigh Valley railroads. This action has been taken much sooner than usual because of the emergencies of the situation. The meeting is usually held about the middle of March. The rates of freight in force are $1.80 for larger sizes and $1.60 for smaller sizes, excepting Pea, Buckwheat, and Culm, and on these last mentioned $1.40. The rates by canal were reduced from $1.45 to $1.25. The anthracite companies are recognizing not only the business necessity for a reduction in the price of coal, but the opposition to the maintenance of apparently monopoly prices, and the result is the first step downward in the right direction. To some this was unexpected, because of the heretofore determined policy of the purchasing companies. Some buyers believe that the second reduction will force itself before the bulk of the spring contracts have been placed. Some that have bought heavily are regretting their course in purchasing so soon, but there is no help for them. It is likely that a good many buyers, in view of the decline, will not place their summer contracts for a few weeks yet; at least, this has been said on the street. There is a good deal of uncertainty in the coal trade over this question of prices. Some representatives of the coal interests, on the contrary, believe that this is the only reduction that will be made; that manufacturing demand will improve; and that, even if prices do not advance, the production agreed upon will be found insufficient for requirements that spring trade developments will press upon the market. There is more inquiry from both Western and Eastern markets; but shipments are out of the question, as the Delaware is frozen tight, and there are no immediate prospects of a break-up. The demand is active for stove sizes particularly. For all other sizes, there is more inquiry, but no very great demand. Large contracts will be placed in a short time. The agents of coal companies are in negotiation, both for coal and rates for its delivery. Tonnage will be in abundant supply, and very low rates will be named. The manufacturing demand in Eastern Pennsylvania has been very light, but will now assume better shape, although the makers of iron say they are not altogether satisfied with prices. The demand for iron and iron products is not very heavy. The Reading Company has abandoned the Alliance Colliery at Mount Carmel. Several collieries in that locality have been idle, among them Pennsylvania, Bellmore, Locust Spring, and Locust Gap. Miners are leaving the section for new coal-fields in the West, and considerable destitution prevails.

The bituminous coal trade is likely to develop considerable activity. Judging from the negotiations in progress, several large contracts will be placed in the East. Some of the operators here say that the decline in anthracite will not be sufficient to give them much trouble, and that they will be able to market an immense product in the East.

The Philadelphia & Reading Company shipped last week 131,226 tons, and for the year 2,201,457 tons, an increase over the shipment for the corresponding time last year of 101,266 tons.

The representatives of the coke interests of this city entertain the hope that they will be able to market much more coke this season than last, and have already secured some favorable contracts. The coke pool has been fixed up by the four railroad companies, and it is probable that its conditions will be observed.

Buffalo. Feb. 26.

[From our Special Correspondent.]

The retail trade in coal has been very good, and is likely to continue; for the demands upon the bins this winter have been urgent, and the stocks intended to last until May have been encroached upon to a considerable extent. The weather has moderated, and we hope that old winter's back is broken.

No changes have been made in the advertised schedule of prices of coal, notwithstanding the reduction made at other points. "If you are in want of coal, come and talk with me," was the answer made by a dealer to me a few days since. I am afraid that I shall have to do so very soon, and then I can give you correct figures.

No agreement has been arrived at relative to the proposed bituminous coal pool; or rather, no announcement to that effect.

I spoke to a newspaper man to-day, saying, "Why don't you give us some coal items?" "How can I publish what I can't get?" said he. "Our coal men keep their mouths shut; they want to hear every thing, and will tell nothing. A pretty set they are for newspaper men to work upon. If I was paid by the line, I should starve unless the guild relieved me after investigation."

The railroads from the mines are working with nearly their accustomed regularity, the snow trouble having been obviated by the plow and muscle.

There seems to be a scarcity of anthracite pea, and some contracts for this size have been allowed to stand over until the railroads are in complete running order again. Run of mines, but principally stack bituminous, has taken its place where the fire-grates would allow of it.

There is an improved feeling among manufacturers, and the indications are for a fair if not good trade. "A consummation most devoutly to be wished" by hundreds of skilled artisans here who have for months been living God only knows how.

The Grand Trunk Railroad of Canada has given notice that it will require, during the ensuing twelve months, about 412,000 tons of bituminous coal; to be the best lump, properly screened, and made free from nut, slack, shale, and other impurities. Tenders for lump and nut mixed, and also for run of mine, will be considered. Date of receipt of tenders, until March 16th, at general offices, Montreal. It will have to be delivered as follows: 313,000 tons, divided into monthly quantities, free of all charges, on east side of Suspension Bridge or International Bridge; also 15,000 tons by rail on board ferry-boats at shipdock at Detroit, Grand Haven & Milwaukee Railroad, same conditions; also 35,000 tons by rail at Detroit Junction, and 3500 tons at South Lyons, same conditions; and 25,000 tons at Sarnia and 20,000 tons at Brockville, by water, free of charges less custom dues, and piled on wharves, same conditions. Payments to be made in cash in the course of the month following delivery.

The New York Central Railroad proposals for coal will also be opened in a few days, but I have not the details of the form of tender.

Boston. Feb. 26.

[From our Special Correspondent.]

There is an actual scarcity of anthracite coal in Boston, and dealers have been obliged to borrow from one another. The wholesale demand has been active, and parties able to ship coal readily have been asking $4.10@$4.15 f. o. b. at New York for Stove. Those dealers who are able to take the Reading Company's steamers have kept them busy. For immediate shipment, New York f. o. b. prices have been $4.10@$4.15 for Stove and $3.15 for Broken, Egg, and Nut, while Pea coal has been selling at irregular prices, according to shipper's stock of this size. As for broken, we still hear that it is produced by New York companies in as small proportion as possible. At $3 f. o. b., it pays about $1.60 at the breakers, and this is unprofitable. The temporary scarcity is largely due to the policy of buying only as actual needs demanded. Quite a large batch of orders has been sent along lately, but the scarcity of vessels and of coal at tide-water to some extent delays the filling of orders.

We quote f. o. b. prices:

At New York, Stove, $3.85@$4; Egg, $3.20@$3.50; Broken, $3.20@$3.40; Pea, $2.25; Nut, $3.45@$3.60. At Philadelphia, $3.90@$4 for Stove; $3.25@$3.50 for Egg; $2 for Pea; $3@$3.15 for Broken. Special coals, $4.75@$5 for Broken, $5.35@$5.50 for Stove.

There is continued activity in bituminous coal, but it is noticeable only in one or two directions. The "outside" companies are getting the contracts, or most of them. The 100,000 tons for the Boston & Maine Railroad are said to have been awarded to the Chesapeake & Ohio and Norfolk & Western railroads, at a low price. The former road has also sold the Hamilton mills and Appleton mills about 15,000 tons, and it looks as if the Chesapeake & Ohio intended to do more coal business in Boston than it has been doing. Its production is said to have increased materially of late. A few other manufacturing contracts have been taken, but a large volume of business is still to be done, and it is proving as backward as we expected it would. As for those bituminous operators that are controlled by the pool, unless they stir about more actively, they will have contracted for an unusually light tonnage.

We quote cargo lots, as before, at $3.60@$3.70, delivered.

Vessels continue scarce at all points, and freights are up for the present. The shore from Somerset to New port is ice-bound. We quote:

New York, $1.25@$1.30; Philadelphia, $1.50; Baltimore, $1.50@$1.60; Newport News, $1.35; Richmond, $1.40@$1.45; Cape Breton, —@—; Bay of Fundy, —@—.

There is an active retail demand, and an advance of 25 cents is obtained. Many dealers are bothered to deliver orders promptly. We quote:

White ash, furnace and egg	$5.25@$5.75
" " stove and nut	5.50@ 6.00
Shamokin, egg	6 00@ 6.25
" " stove	6.25@ 6.50
Lorberry, egg and stove	6.50@ 7.00
Franklin, egg and stove	7 50
Lehigh, furnace, egg, and stove	5.50@ 6.00
" nut	5.75@ 6.50

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended February 21st, and year from January 1st:

Tons of 2240 lbs.	1885.		1884.	
	Week.	Year.	Week.	Year.
D. & H. Canal Co..	48,155	354,814	57,820	390,476
D., L. & W. RR. Co.	64,803	437,768	85,288	580,821
Penna. Coal Co.....	*	78,083	17,956	128,0·9
L. V. RR. Co.....	21,218	150,591	20,933	165,135
P. & N. Y. RR. Co..	1,180	15,711	3,323	24,163
North & West Br. RR.....	*	141,769	15,619	116,602
L. V. RR. Co.....	53,951	439,510	62,693	544,612
S. H. & W. B. RR..	*	13,919	4,878	28,034
P. & R. RR. Co	138,476	1,049,486	147,415	1,225,478
Mt Line&Sul.RR.Co.	1,851	11,880	1,794	11,135
Total...	329,634	2,693,531	417,719	3,214,545
Increase..	.....	.....	.....	.....
Decrease	... .	521,014	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

* Reports not received.

Total same time in 1880	2,921,937 tons.
" " " " 1881	3,495,488 "
" " " " 1882	3,119,323 "
" " " " 1883	3,552,821 "

The increase in shipments of Cumberland Coal over the Cumberland & Pennsylvania Railroad and branches amounts to 13,469 tons, as compared with the corresponding period of 1884.

Comparative Statement of the Production of Bituminous Coal for the week ended February 14th, and year from January 1st:

Tons of 2000 pounds, unless otherwise designated.

	1885.		1884.	
	Week.	Year.	Week.	Year.
Cumberland Region, Md.				
Tons of 2240 lbs....	34,864	217.306		174,779
Barclay Region, Pa.				
Barclay RR., tons of 2240 lbs.....	4,559	31,453		42,147
Broad Top Region, Pa.				
Huntington & Broad Top RR., tons of 2240 lbs.....	2,698	18,556		20,911
East Broad Top....	.....	.....		.....
Clearfield Region, Pa.				
Snow Shoe.....	3,531	26,112		26,682
Karthaus (Keating)	1,583	7,753		.....
Tyrone & Clearfield	58,670	370,449		285,529
Alleghany Region, Pa.				
Gallitzin & Mountain.....	9,801	62,186		57,328
Pittsburg Region, Pa.				
West Penn RR.....	4,420	32,715		45,292
SouthwestPenn.RR.	1,539	13,027		18,863
Pennsylvania RR...	4,247	23,701		32,814
Westmoreland Region, Pa.				
Pennsylvania RR...	13,036	143,002		131,100
Monongahela Region, Pa.				
Pennsylvania RR...	3,220	23,771		19,405
Total.....	142,168	970,031		854,850
Decrease	.....	†		.....

Comparative Statement of the Transportation of Coke over the Pennsylvania Railroad for the week ended February 14th, and year from January 1st:

Tons of 2000 pounds.

	1885.		1884.	
	Week.	Year.	Week.	Year.
Gallitzin & Mountain (Alleghany Region).....	3,136	24,199		14,697
West Penn. RR.....	56	606		14,604
Southwest Penn. RR	34,272	216,973		233,754
Penn. & Westmoreland Region, Pa. RR	5,322	32,551		22,078
Monongahela, Penn. RR.....	871	7,953		8,777
Pittsburg Region, Pa. RR.....	.....	.....		47
Snow Shoe (Clearfield Region).....	427	2,658		2,737
Total....	44,084	284,940		296,694
Decrease.....	.....	†		.....

† The reports for the corresponding week in 1884 were not published, and consequently we are unable to give the exact figures of the decrease.